



2007 Minerals Yearbook

UNITED ARAB EMIRATES

THE MINERAL INDUSTRY OF THE UNITED ARAB EMIRATES

By Mowafa Taib

The United Arab Emirates (UAE)¹ was one of the world's leading producers of crude oil, accounting for 3.5% of world crude oil production in 2007. The UAE held about 8% of the world's total crude oil reserves and ranked fifth following Iraq, Iran, Kuwait, and Saudi Arabia in terms of the size of its proven crude oil reserves. The UAE was responsible for 1.7% of the world's supply of natural gas; it held 6 trillion cubic meters of proved natural gas reserves, or 3.4% of the world's total, and was ranked fifth in the world in terms of its proved natural gas reserves following Iran, Qatar, Russia, and Saudi Arabia. The UAE was a major supplier of foundry alloy, extrusion billet, and high-purity aluminum to 280 clients in 46 countries. It produced about 2.4% of the world's smelter output and held about 2.2% of the world's aluminum production capacity at yearend 2007 (BP p.l.c., 2008, p. 8, 9, 22, 25; Bray, 2008; Dubai Aluminum Company Ltd., 2008).

Minerals in the National Economy

In 2007, the gross domestic product (GDP) of the UAE grew at a rate of 16.8% at current prices, and the average real growth in the GDP for the 2003-07 time period was 9.3%. The growth in the GDP was attributed to several factors, chief of which was the 13.1% increase in world oil prices. The nonoil GDP grew at a rate of 16.8% as well, and accounted for 64.1% of the country's total GDP. The hydrocarbon sector accounted for about 60% of the UAE's economic activities. The construction and building sector achieved the highest growth rate (25.6%) among goods-producing sectors; it was followed by the manufacturing sector (19.6%), which included the production of processed mineral-based commodities, then the oil sector (16.8%), and the quarrying sector (0.3%). Of the country's total labor force of 3.1 million, about 624,000 worked in the construction sector, and about 362,000 worked in the manufacturing sector. The mining and quarrying sector employed 38,782 people in crude oil and natural gas production and 6,417 in mining and quarrying activities (Ministry of the Economy, 2008).

In 2007, the value of UAE crude oil, condensate, and petroleum products exports was estimated to be \$84.4 billion² (about 46.7% of total exports and reexports) compared with \$71.1 billion in 2006 (about 48.1% of total exports and reexports). Much of the increase in the value of hydrocarbon exports was owing to the rise in the price of crude oil, which, for the UAE, averaged \$71.70 per barrel in 2007, which was up from \$63.5 per barrel in 2006. Natural gas exports were valued at \$7.8 billion,

and refined petroleum products exports, at \$5.4 billion (Central Bank of the United Arab Emirates, 2008, p. 9, 43).

In 2007, the value of U.S. imports from the UAE were as follows: \$317 million of aluminum products (about 2.4% of total U.S. aluminum imports), \$267 million of crude oil and other petroleum products, \$205 million of uncut diamond, and \$45 million of advanced iron and steel products (Workman, 2008).

Production

Data on mineral production are in table 1. Table 1 shows increases in aluminum, cement, and natural gas production in 2007 compared with 2006 production. Crude production was slightly lower in 2007 than in 2006.

Structure of the Mineral Industry

The governments of the individual Emirates of the UAE maintained significant interest in the country's mineral industry. Hydrocarbons were produced primarily by companies that were owned by the government of the Emirate of Abu Dhabi. The government of the Emirate of Dubai owned the country's sole primary aluminum producer, Dubai Aluminum Company Ltd. (Dubal). Some of the cement companies were owned by individual Emirate governments, such as the governments of the Emirates of Ras Al Khaimah and Sharjah, and others were owned by private and joint-venture companies. The Ministry of the Economy regulated the country's mineral resources and monitored the implementation of laws and agreement obligations of companies operating in the mineral sector.

The objectives of the Ministry of Energy were to enhance free market principles, create a more-competitive environment for the production and distribution of energy products, minimize the adverse effects of the United Nations Convention on Climate Change on the UAE's oil and gas exports, prepare geologic and geophysical maps for the country, and promote the use of alternative and renewable energy sources.

The overall surplus in the country's balance of payments, which amounted to about \$50 billion in 2007, triggered a substantial increase in investment in the country's infrastructure. On average, investment increased by 22% in 2007 for all sectors of the economy, including the construction, manufacturing, and oil sectors (Ministry of the Economy, 2008).

Abu Dhabi Basic Industries Corp. (Adbic) was created in March 2007 as a state-owned holding company. Its role is to promote the Government's economic diversification policies by investing and creating partnerships with local and international enterprises in the aluminum, cement, petrochemical, and steel industries, and to encourage downstream metal production (Middle East Economic Digest, 2007a).

¹The United Arab Emirates is a federation of seven Emirates: Abu Dhabi, Ajman, Dubai, Fujairah, Ras Al Khaimah, Sharjah, and Umm Al Quwain.

²Where necessary, 2007 values have been converted from United Arab Emirates dirham (Dh) to U.S. dollars (US\$) at the rate of Dh3.6725= US\$1.00.

A number of energy companies were established through initial public offerings in the UAE in the past few years alongside state-owned Abu Dhabi National Oil Co. (Adnoc) and its subsidiaries. One of these companies was Abu Dhabi National Energy Company PJSC (TAQA), which was an energy company based in Abu Dhabi that was majority owned by Abu Dhabi Water and Electricity Authority. TAQA invested in energy assets in Europe (including in the North Sea) and North America. Another Adnoc subsidiary, Aabar Investments Co. PJSC, was Abu Dhabi's first listed oil company. Dana Gas PJSC, which was based in Sharjah and listed in the Abu Dhabi securities exchange, was launched as a public company in 2005; it had more than 4,000 shareholders and was involved in gas production projects throughout the Middle East, north Africa, and south Asia (Middle East Economist Digest, 2007b).

The economic boom of the past 5 years had created a serious challenge for the Government to satisfy the demand for energy, which had increased by 15% to 20% annually, by virtually all sectors of the economy, and most especially the construction, manufacturing, and oil sectors. It was estimated that the UAE would need an additional power capacity of 22,000 megawatts (MW) within the next 7 years, which is equivalent to the capacity of 12 large conventional power stations.

Securing gas was seen as an essential component for sustaining growth in the Gulf region. To meet the demand for gas, Adnoc planned to produce gas from sour gas reserves at the Bab, the Hail, and the Shah oilfields. Sour gas makes up more than one-half of the UAE's confirmed gas reserves of 6 trillion cubic meters. Adnoc also planned to replace associated gas with nitrogen gas for the reinjection of oilfields to maintain reservoir pressure. This was expected to make more natural gas available for use by industry and utilities. Dubai Electric and Water Authority considered plans to build several coal-fired powerplants, each of which would have a capacity of up to 4,000 MW.

The Emirates Nuclear Energy Corp. signed a partnership agreement with three French companies—Areva T&D, GDF Suez, and Total U.A.E—for two next-generation nuclear powerplants in Abu Dhabi (Middle East Economic Digest, 2007c, 2008a).

Commodity Review

Metals

Aluminum.—Dubal was the world's seventh ranked producer of aluminum and had the largest onsite aluminum smelter operations in the western world at Jabal Ali in the Dubai Emirate. In 2007, Dubal production reached about 890,000 metric tons (t) of high quality hot metal, which was 3.4% more than output in 2006. The company was working on increasing its hot-metal production capacity to 950,000 metric tons per year (t/yr) by the end of 2008 (Behre Dolbear & Company Inc., 2008).

Emirates Aluminum (Emal) was founded in February 2007 as a 50-50 joint-venture enterprise between Dubal and Mubadala Development Co. to build the world's largest-capacity smelter at Khalifah Port and the Taweelah Industrial Zone in the Emirate of Abu Dhabi. The construction of the Emal Taweelah

aluminum smelter complex began in 2007. The first phase of the project was expected to be completed in 2010 with a production capacity of 700,000 t/yr at an estimated cost of \$5.6 billion. The complex was designed to have its own 2,000-MW powerplant, which would use natural gas supplied by Adnoc through a gas-insulated substation to generate electricity. The gas supply was guaranteed for 30 years by a contract signed between Adnoc and Emal (Middle East Economic Digest, 2008b, c). Outotec OYJ of Finland was commissioned to provide the Emal smelter with a new green anode plant and spent anode crushing equipment at a cost of about \$100 million (Outotec OYJ, 2007).

Adbic was established in 2007 by the Abu Dhabi Government General Holding Corp. (GHC) to advance sustainable industrial growth in Abu Dhabi by focusing on the base metals sector, the petrochemical sector, and other industrial sectors. Adbic negotiated a deal with Rio Tinto Alcan plc to build a greenfield smelter with a capacity of between 550,000 and 700,000 t/yr at a cost of \$3 billion. The project, which would give Rio Tinto Alcan a 50% interest in 2011, passed the feasibility phase in late 2007 and was scheduled to commence operations within 4 years (Gulf Business, 2007; Middle East Economic Digest, 2007a; Rio Tinto Alcan, 2008).

The UAE'S actual and planned projects were expected to put UAE's total production capacity of aluminum at 2.3 million metric tons per year (Mt/yr), which represents 45% to 50% of the total production capacity of the Gulf Cooperation Council (GCC) countries. The GCC countries are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (Oil and Industry News, 2008b).

Copper.—Dubai Cable Co. (Ducab) was a subsidiary of GHC, which was owned jointly by the governments of Dubai and Abu Dhabi (50% each). Ducab owned two plants for copper production and wire cable manufacture—one at Jabal Ali in Dubai and one at the industrial city of Mussafah in Abu Dhabi. Ducab moved forward to expand its production capacity of low- and medium-voltage cables to 110,000 cubic tons per year of copper equivalent from 65,000 cubic tons per year of copper equivalent by building a new cable plant in Mussafah; the plant would manufacture magnetized wire for engines and generators and would have a production capacity of 25,000 cubic tons per year of copper and 7,000 cubic tons per year of aluminum cable (Metals Insider, 2008).

Ras Al Khaimah Minerals and Metal Investment, which was a state-owned agency, planned to invest \$250 million in copper and cobalt mining and processing projects in the Democratic Republic of the Congo [Congo (Kinshasa)], including building a copper and cobalt smelter in the Katanga region. The company later increased the size of its planned mining investment to \$1 billion and made plans to enter the mining sector in Armenia, Eastern Europe, and Indonesia (Middle East Economic Digest, 2008d).

Gold.—Three gold refineries were members of the DMCC in 2007. They included Al Ghaith Gold, Al Ghurair Giga Gold, and Emirate Gold. Both Emirate Gold and Al Ghurair Giga Gold had operated at DMCC since 2004; Al Ghaith Gold was expected to move its operations to DMCC in 2010 (Dubai Multi Commodities Center, 2008).

The value of gold trade at Dubai Gold Center for 2007 was \$19.0 billion compared with \$14.7 for 2006. The volume of gold

imports was 559 troy ounces and that of exports was 287 troy ounces in 2007 compared with 489 troy ounces and 274 troy ounces in 2006, respectively (Source, The, 2008).

Iron and Steel.—The UAE's steel consumption was forecast to reach 9.2 million metric tons (Mt) in 2010 compared with 5.5 Mt in 2005. The GCC countries' steel consumption increased by an average of 14.6% in the period between 2002 and 2007. In the UAE, steel consumption increased by more than 25% per year during the same period (Metal Bulletin Monthly, 2007).

The per capita consumption of steel in the UAE was estimated to be 801 kilograms per year in 2004, which was the highest in the Middle East. The average steel price in the Gulf peaked in December 2007 at \$680 per metric ton. The increase, which was driven by strong regional demand from the enormous construction projects in both the residential and industrial sectors, encouraged many investors and major intentional producers to enter the UAE steel market (Arab Steel, 2007; Khaleej Times Online, 2007).

Al Nasser Industries Enterprises LLC, which was a subsidiary of Al Nasser Holding Co., commissioned Tenova HYL to build a direct-reduced iron (DRI) plant with 200,000 t/yr of capacity in Abu Dhabi. Production from this plant was expected in the first half of 2008. Gulf Steel Industries Co. Ltd., which was a subsidiary of Al Nasser Industrial Enterprises, built a rebar mill supplied by Siemens VAI Metal Technologies Ltd. in the Mussaffah Industrial Zone at Abu Dhabi. The rebar line, which was designed to produce 400,000 t/yr of carbon steel bars, was scheduled to begin operating in early 2009 (Siemens VAI Metal Technologies Ltd., 2007b).

Emirates Steel Industries (ESI), formerly known as Emirates Iron and Steel Factory, which was owned by the Government of Abu Dhabi and had a production capacity of 600,000 t/yr, had made rebar products since 2002. ESI produced 540,000 t of steel products during the first 9 months of 2007 and generated about \$540 million of sales during the same period. The company's expansion plans were expected to raise its combined production capacity of billet, DRI, rebar, and wire rod products to 1.8 Mt/yr by 2008 and to 3 Mt/yr by 2011 (Arab Steel, 2008). Abu Dhabi National Company for Building Materials, PJSC (BILDCO) commissioned Siemens VAI to build a new 300,000-t/yr-capacity bar mill at its plant in Mussaffah, Abu Dhabi. Production from the new mill was scheduled to begin at the end of 2008 (Siemens VAI Metal Technologies Ltd., 2007a).

Metalloinvest Steel, LLC of Russia announced in December 2006 the establishment of Humriyah Steel as a joint venture with domestic investors. Humriyah Steel commissioned SMS Meer GmbH of Germany to build a bar mill in the Sharjah Emirate. The steel mill was designed to produce 1 Mt/yr of rebar and was scheduled to begin commercial production in 2009 (Metalloinvest Steel LLC, 2006; SMS Meer GmbH, 2008).

Industrial Minerals

Cement.—Cement manufacturing was one of the oldest economic production sectors in the UAE. The construction boom in Abu Dhabi and Dubai and other Emirates encouraged investors to enter the cement market by increasing the capacities

of local cement producers and building new cement production facilities. At the end of 2007, there were 10 integrated cement production plants and 9 grinding facilities distributed across the seven Emirates of the UAE. The grinding operators imported clinker from China, India, and Pakistan to produce cement (Armstrong, 2008).

Cement production in 2007 totaled about 15 Mt, which was up from 14 Mt in 2006. Total production capacities in 2007 were estimated to be 27.2 Mt of cement and 16.2 Mt of clinker. However, the planned investment of \$6.7 billion in this industry was expected to increase capacity to 31.9 Mt for cement and 18.7 Mt for clinker during 2008 and perhaps double the current production level in 2010. This would make the UAE the second ranked GCC country in cement production after Saudi Arabia; production from both countries would equal 90% of the cement market of the GCC countries.

To protect the construction industry from the cement market price manipulation, the Government placed a cap on the price of cement at the end of 2007 and asked cement producers to consider exporting the potential surplus cement produced in the UAE (Global Cement, 2007; Middle East Economic Digest, 2007a; Armstrong, 2008).

The Union Cement Co. (UCC) at Ras Al Khaimah was the cement market leader followed by Sharjah Cement Factory, Gulf Cement Co., Fujairah Cement Industries, National Cement Co. P.S.C., Ras Al Khaimah Cement Co., and Umm Al Qaywayn Cement Industries Co. The major companies that entered the UAE cement market included CEMEX S.A.B. de C.V. of Mexico, which started its 1.6-Mt grinding plant in Dubai at the end of 2007; China National Material Equipment Corp. (CBMEC), which installed a 10,000-metric-ton-per-day (t/d)-capacity cement line in Ras Al Khaimah for UCC; Holcim Ltd. of France, which finished building a 2.2-Mt/yr grinding unit for the National Cement Factory in Abu Dhabi (a joint venture between Holcim and the Emirate International Investment Co.); and Lafarge S.A. of France, which acquired the cement production unit of Orascom Construction Industries. Orascom had built the Emirates Cement Factory in Al Fujairah, which had a production capacity of 3.1 Mt/yr (Armstrong, 2008).

Diamond.—Dubai Multi Commodities Centre (DMCC) expanded its operations in 2007 by adding more commodities for trading. The commodities that were offered for trading included base metals, colored stones and pearls, diamond, energy, gold and precious metals, plastics and petrochemicals, and steel. Dubai's diamond trade, which included both rough and polished diamond, rose by 53% in 2007 to reach \$11.23 billion compared with \$7.32 billion in 2006. Rough diamond was imported mainly from Angola, Russia, and South Africa, and polished diamond was imported from Belgium and India (Source, The, 2008).

Nitrogen.—Ruwais Fertilizer Industries Ltd. (Fertil), which was a subsidiary of Adnoc, proceeded with its expansion plans for the ammonia and urea complex in the Ruwais refinery. Fertil awarded two contracts in 2007 for its debottlenecking project. The first contract, which was worth \$177 million, was given to Descon Engineering Ltd. of Pakistan; the second contract, which was worth \$63 million, was given to the Swiss company Urea Casale. The expansion plan aimed to increase the capacity of the

urea plant by 50% by converting 90,000 t/yr of ammonia to urea and to provide 250,000 t/yr of urea to the Abu Dhabi Polymers Co. melamine plant, which was being built. About 30% of the urea produced (800 t/d) was to be sent to the melamine plant, and the remaining 70% (1,900 t/d) was to be granulated and marketed as nitrogen fertilizer (Middle East Economic Digest, 2007d; Ruwais Fertilizer Industries Ltd., 2008).

Silica.—The construction boom in the Gulf region significantly increased the demand for glass and, subsequently, for silica sand, which accounted for about 70% of the raw materials used to manufacture glass. Guardian Industries Corp., which had been the major glass supplier to the Gulf glass market since the 1990s, enhanced its market share when it began producing glass in September 2007 at the UAE's first manufacturing facility, which was located in Ras Al-Khaimah. The plant was set up to produce 750 t/d of glass. Emirate Float Glass, which was owned by the Dubai Investment PJSC subsidiary Glass LLC, was set to start glass production in 2008 at its gas-fired plant in Abu Dhabi; the plant had a production capacity of 600,000 t/d (Middle East Economic Digest, 2007e).

Sulfur.—UAE sulfur production could undergo a substantial increase if the plans to use the sour gas reserves in the Bab, the Hail, and the Shah oilfields were to materialize. The high levels of hydrogen sulfide present in sour gasfields require a separation during sweetening of the natural gas, which would result in capturing sulfur as a byproduct. However, this process would require a specialized type of steel to store sour gas because of the damaging effect of the gas on regular steel pipes and storage containers. Takreer awarded India-based Dodsall PTE Ltd. a \$272 million contract to provide engineering, procurement, and construction services for expansion of the liquid sulfur production unit at the Ruwais refinery. The project, which was scheduled to be completed in 2009, was designed to increase the storage and processing capacity (Arab News, 2007).

Mineral Fuels and Other Sources of Energy

Natural Gas.—Abu Dhabi Gas Industries Co. (Gasco) moved forward with the engineering work needed to produce natural gas from sour gas present in the Shah Field. The project involved building a gas gathering system, a gas processing facility, and a sulfur management system.

Adnoc announced its intention to invest \$7 billion to increase natural gas production by 36% in 2009. The company, which currently produced 5.3 billion cubic meters per day, planned to raise its production to 7.2 billion cubic meters per day.

In July 2007, natural gas from the Qatar offshore North Field started flowing to Abu Dhabi by way of the underwater Dolphin pipeline at a rate of 56.6 million cubic meters per day. The Dolphin pipeline represented a new age in cross-border cooperation among the Gulf countries. In the second phase of the project, which was to begin in 2008, gas was to be delivered to all Emirates and to Oman and the capacity would be increased to 90.6 million cubic meters per day. Dolphin Energy Co. Ltd., which was owned by Mubadala Development Co. (51%), and Occidental Petroleum, and Total Group (24.5% each), planned to supply Oman Oil Co. with gas from the offshore gasfields of Qatar; the gas would be treated in Ras Lafan, where it would

be compressed and pumped to Abu Dhabi and transmitted by pipelines to Al-Ain on the border with Oman where the Dolphine Energy Pipeline connects with the Oman Oil Co. pipeline (Middle East Economic Digest, 2007g; Oil and Industry News, 2008a).

Petroleum.—Abu Dhabi Company for Onshore Oil Operations (Adco) started a multibillion-dollar full-field development program for the Asab, the Sahil, and the Shah Fields. Adnoc canceled its gasoline and aromatics expansion plan at the Ruwais oil refinery. The plan was announced in early 2007 by Abu Dhabi Oil Refining Co. (Takreer).

After a 4-year period of stoppage, Fujairah Refinery Co. resumed refining operations at its sole refinery in the Emirate of Fujairah; the refinery had a capacity of 20,000 barrels per day (bbl/d). The company eventually planned to raise the refinery's capacity to 82,000 bbl/d (Organization of Arab Petroleum Exporting Countries, 2008, p. 143).

United States-based ConocoPhillips Co. cancelled the deal signed in 2006 with Abu Dhabi Petroleum Investment Co. (IPIC) to build an oil refinery in the Emirate of Fujairah because of rising costs. The project's goal had been to construct another refinery in Fujairah that would have a production capacity of 500,000-bbl/d; production would be intended entirely for export. The company tendered its exploration and production operations in UAE to the Dubai government, thus ending 45 years of operations in the country (Middle East Economic Digest, 2007f).

Renewable Energy.—In addition to investing in traditional hydrocarbon energy resources to maximize its existing crude oil and gas production capacity, the UAE was searching for new sources of energy through the establishment of the world's largest alternative energy initiative. Abu Dhabi Future Energy Co., known also by its Arabic name Masdar, which means source, was a global program whose mission was to find solutions for energy security, sustainable energy, and climate change. Masdar, which was entirely owned by the Mubadala Development Co., teamed up with academic and business institutions to apply the latest technologies in carbon management, and solar and hydrogen-based energy, as well as other clean energy technologies. Construction of "Masdar City," which would be the world's first neutral carbon and waste city and which was planned to be completely powered by renewable energy, was underway and was scheduled to be finished by 2014 at a cost of \$20 billion. Masdar planned to build a hydrogen powerplant at Ruwais that would provide 420 MW of electric power, desalinate seawater using reverse osmosis technology to produce 76,000 to 95,000 cubic meters per day (20 million to 25 million gallons per day) of water, and have a carbon capture and storage capability. The plant, which was a joint venture of BP Alternative Energy p.l.c., Masdar, and Rio Tinto Alcan, would divide the natural gas supplied by Adnoc into carbon monoxide and hydrogen. The carbon monoxide gas would be converted to carbon dioxide and inserted back into the northern Bab oilfield, and the hydrogen would be used to generate electricity by powering the turbines (Middle East Economic Digest, 2006, 2008e).

Outlook

Future developments in the mineral industry of the UAE will be closely related to the trends in energy consumption, production, and innovations in the rest of the world. The UAE will likely continue to invest in hydrocarbon production to increase the production life time of its gas and oil reserves, especially in the production of natural gas from the sour gas reserves present in the Shah Field. The UAE will also likely invest in other resources of energy, including hydrogen, nuclear and solar energy, such as in the work at Masdar City that was aimed at using hydrogen gas to generate electricity and carbon dioxide to reinject gasfields. Aluminum, cement, float glass, nitrogen fertilizers, steel, and sulfur production in the UAE will increase significantly when the current expansion projects are completed within the next 3 years.

References Cited

- Arab News, 2007, Takreer, Dodsai in AED1bn deal: Arab News, February 21. (Accessed February 10, 2009, at <http://www.arabnews.com/?page=6§ion=0&article=92506&d=20&m=2&y=2007.>)
- Arab Steel, 2007, Construction boom sparks steel demand in Arab world: Arab Iron and Steel Union, July 19. (Accessed February 10, 2009, at http://www.arabsteel.info/total/Long_News_Total_e.asp?ID=383.)
- Arab Steel, 2008, 3 billion Dirhams are the total sales of Emirates Steel Industries in 9 months and the production capacity reaches 1.8 million tons per year: Arab Iron and Steel Union, October 15. (Accessed February 10, 2009, at http://www.arabsteel.info/total/Long_News_Total_e.asp?ID=456.)
- Armstrong, Tom, 2008, UAE—Update and outlook: International Cement Review, April.
- Behre Dolbear & Company Inc., 2008, Dubai 2007 aluminum output up by 12.6% YOY: Global Mining News, no. 206, June 16, p. 4.
- BP p.l.c., 2008, BP statistical review of world energy, June 2007: London, United Kingdom, BP p.l.c., 45 p.
- Bray, E.L., 2008, Aluminum: U.S. Geological Survey Mineral Commodity Summaries, 2008, p. 22-23.
- Central Bank of the United Arab Emirates, 2008, Economic bulletin: Abu Dhabi, United Arab Emirates, Central Bank of the United Arab Emirates, 80 p.
- Dubai Aluminum Company Ltd., 2008, Dubai Aluminum—Facts & figures: Dubai, United Arab Emirates, Dubai Aluminum Company Ltd., 4 p. (Accessed January 5, 2009, via <http://www.dubal.ae/aboutus/overview.aspx.>)
- Dubai Multi Commodities Center, 2008, Precious commodities—Gold: Dubai, United Arab Emirates, Dubai Multi Commodities Center. (Accessed February 10, 2009, at <http://www.dmcc.ae/en/precious-commodities/gold/gold-refineries/gold-refineries.html.>)
- Global Cement, 2007, UAE cement makers must export to beat overcapacity, warns minister of public works director: Pro Publication International Ltd., July–August, p. 63.
- Gulf Business, 2007, Showing mettle: Motivate Publishing, September. (Accessed March 6, 2009, at <http://zawya.com/printstory.cfm?storyid=ZAWYA20070903074930&l=065627070914.>)
- Khaleej Times Online, 2007, Saudi Arabia, Egypt and UAE to top ME steel demand: Khaleej Times Online, August 7. (Accessed February 26, 2009, at http://www.khaleejtimes.com/DisplayArticleNew.asp?section=business&xfile=data/business/2007/august/business_august102.xml.)
- Metal Bulletin Monthly, 2007, Long-term view: Metal Bulletin Monthly, no. 443, December, p. 26.
- Metalloinvest Steel LLC, 2006, Metalloinvest to build steel mill in UAE: Moscow, Russia, Metalloinvest Steel LLC press release, December 6. (Accessed February 12, 2009, at <http://www.metinvest.com/eng/newspage.aspx?id=46.>)
- Metals Insider, 2008, Gulf Cable Company expands with two new copper plants: London, United Kingdom, Sudden Ltd., June 13.
- Middle East Economic Digest, 2006, Looking for an alternative: Middle East Economic Digest, v. 50, no. 48, December 1, p. 86.
- Middle East Economic Digest, 2007a, Adnoc considers nitrogen reinjection: Middle East Economic Digest, v. 51, no. 38, September 21, p. 14.
- Middle East Economic Digest, 2007b, An aggressive new breed: Middle East Economic Digest, v. 51, no. 35, August 31, p. 50.
- Middle East Economic Digest, 2007c, Conoco pulls out of Fujairah refinery: Middle East Economic Digest, v. 51, no. 37, September 14, p. 10.
- Middle East Economic Digest, 2007d, Descon takes \$180m Fertil expansion: Middle East Economic Digest, v. 51, no. 29, July 20, p. 11.
- Middle East Economic Digest, 2007e, Gas shortfall leaves a sour taste: Middle East Economic Digest, v. 51, no. 35, August 31, p. 8.
- Middle East Economic Digest, 2007f, Rising costs hinder diversification: Middle East Economic Digest, v. 51, no. 50, December 14, p. 58.
- Middle East Economic Digest, 2007g, Rival set to reshape market: Middle East Economic Digest, v. 51, no. 49, December 7, p. 69.
- Middle East Economic Digest, 2008a, Abu Dhabi seeks financing for Ruwais hydrogen power plant: Middle East Economic Digest, v. 52, no. 4, January 25, p. 16.
- Middle East Economic Digest, 2008b, Emal signs 30-year gas deal with Adnoc: Middle East Economic Digest, v. 52, no. 19, May 9, p. 13.
- Middle East Economic Digest, 2008c, Extracting profits from sour gas: Middle East Economic Digest, v. 52, no. 7, February 15, p. 44.
- Middle East Economic Digest, 2008d, Mining firm to expand to Europe: Middle East Economic Digest, v. 52, no. 10, March 7, p. 15.
- Middle East Economic Digest, 2008e, The joint venture of Abu Dhabi and Dubai is aiming to create the world's largest aluminum smelter: Middle East Economic Digest, v. 52, no. 10, March 7, p. 32.
- Ministry of the Economy, 2008, Central Statistical Department, annual social and economic report—2007: Abu Dhabi, United Arab Emirates, Ministry of the Economy, p. 26.
- Oil and Industry News, 2008a, Monthly news wire—Dolphin's vision is realized by achieving 3.2 billion cubic foot per day: Abu Dhabi, United Arab Emirates, Ministry of Energy, no. 452, May, p. 8.
- Oil and Industry News, 2008b, Monthly news wire—UAE gets more than half of investments and production: Abu Dhabi, United Arab Emirates, Ministry of Energy, no. 458, November, p. 38.
- Organization of Arab Petroleum Exporting Countries, 2008, 34th secretary general report 2007: Safat, Kuwait, Organization of Arab Petroleum Exporting Countries, 296 p.
- Outotec OYJ, 2007, Outotec to supply anode plant technology for aluminum smelter in Abu Dhabi: Helsinki, Finland, Outotec OYJ, July 26.
- Rio Tinto Alcan, 2008, Key projects: Rio Tinto Alcan press release, January 16, 10 p.
- Ruwais Fertilizer Industries Ltd., 2008, Urea debottlenecking project: Ruwais Fertilizer Industries Ltd. press release, March 11, 1 p.
- Siemens VAI Metal Technologies Ltd., 2007a, New mill in the United Arab Emirates: Siemens VAI Metal Technologies press release, October 24, 1 p.
- Siemens VAI Metal Technologies Ltd., 2007b, Siemens supplies rebar mill to Gulf Steel Industries in the United Arab Emirates: Siemens VAI Metal Technologies press release, July 11, 1 p.
- SMS Meer GmbH, 2008, Bar mill for the United Arab Emirates: SMS Meer GmbH press release, June 19, 2 p. (Accessed February 26, 2009, at http://www.sms-meer.com/news/pdf/20080619_ehamriyahsteel.pdf.)
- Source, The, 2008, Dubai's diamond trade reached US\$11.23 billion in 2007: Dubai, United Arab Emirates, Dubai Multi Commodities Center, p. 14.
- Workman, Daniel, 2008, Top UAE exports & imports: Suite101.com, June 5. (Accessed February 20, 2009, at http://import-export.suite101.com/article.cfm/top_uae_exports_imports.)

TABLE 1
 UNITED ARAB EMIRATES: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Thousand metric tons unless otherwise specified)

Commodity ³	2003	2004	2005	2006	2007
Aluminum, primary	560	683	722	861	890
Cement, hydraulic	8,000	9,000	10,000	14,000 ^r	15,000
Chromite ore	(4)	5 ^{r,5}	(4)	(4)	19
Gas, natural:					
Gross million cubic meters	64,000 ^r	68,000 ^r	70,500 ^r	72,410 ^{r,5}	74,630 ⁵
Dry do.	44,800 ^r	46,300 ^r	47,800 ^r	48,800 ^r	50,300
Gypsum	100	110	120	130	150
Lime	50	50	50	60	60
Natural gas plant liquids thousand 42-gallon barrels	146,000 ^r	146,000 ^r	114,000 ^r	114,000 ^r	114,000
Nitrogen:					
N content of ammonia	421	380 ⁵	360	380 ⁵	380
N content of urea	300	270	260	270	270
Petroleum:					
Crude thousand 42-gallon barrels	820,000 ^r	855,000 ^r	868,000 ^r	937,000 ^r	933,000
Refinery products					
Liquefied petroleum gas do.	1,500 ^r	1,600 ^r	1,600 ^r	1,500 ^r	2,000
Gasoline do.	9,400 ^r	9,500 ^r	10,900 ^r	13,200 ^r	13,200
Kerosene do.	43,200 ^r	40,000 ^r	41,200 ^r	40,100 ^r	31,000
Distillate fuels do.	28,400 ^r	28,000 ^r	25,300 ^r	26,800 ^r	20,300
Residual fuels do.	7,600 ^r	7,900 ^r	6,600 ^r	5,300 ^r	2,400
Other do.	46,300 ^r	43,000 ^r	41,600 ^r	34,400 ^r	29,900
Total do.	136,000 ^r	130,000 ^r	127,000 ^r	121,000 ^r	98,800
Steel	90 ^r	90 ^r	90 ^r	90 ^r	90
Sulfur, byproduct of petroleum refining and natural gas processing	1,900	1,930	1,950	1,950	1,950

^rRevised. do. Ditto.

¹Estimated; estimated data and totals are rounded to no more than three significant digits.

²Table includes data available through March 31, 2009.

³In addition to the commodities listed, crude industrial minerals, such as common clays, diabase, gravel, limestone, marble, sand, and shale presumably are produced, but output is not reported, and information is inadequate to make reliable estimates of output.

⁴Negligible or no production.

⁵Reported figure.

TABLE 2
UNITED ARAB EMIRATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Aluminum		Dubai Aluminum Company Ltd. (Investment Corporation of Dubai, 100%)	Jebel Ali, Dubai	950
Cement:				
Portland		Gulf Cement Co. (National Investments Company of Kuwait, 27%, and Government of Ras Al Khaimah, 8%)	Khor Khuwair, Ras Al Khaimah	2,700
Do.		Sharjah Cement and Industrial Development Co. (private, 70%, and Government of Sharjah, 30%)	Sharjah	3,000
Do.		National Cement Company P.S.C.	Dubai	1,500
Do.		National Cement Factory	Abu Dhabi	2,500
Do.		Union Cement Co. (Government of Ras Al Khaimah, 41%, and Abu Dhabi Investment Authority, 20%)	Khor Khuwair, Ras Al Khaimah	4,200
Do.		Fujairah Cement Industries	Dibba, Fujairah	3,100
Do.		Emirates Cement Factory (General Holding Corp.)	Al-Ain, Abu Dhabi	2,200
Do.		Ras Al Khaimah Cement Co.	Khor Khuwair, Ras Al Khaimah	1,200
Do.		Arabian Gulf Cement Company LLC	Ajman	900
Do.		Jebel Ali Cement Co. (Sharaf Industries, 100%)	Jebel Ali, Dubai	800
Do.		Umm al-Qaywayn Cement Industries Co.	Umm al-Qaywayn	1,600
White		Ras Al Khaimah Company for White Cement and Construction Materials	Ras Al Khaimah	500
Gold, refined	metric tons	Emirates Gold (private, 100%)	Dubai	200
Do.	do.	Al Ghurair Giga Gold (private, 100%)	do.	100
Do.	do.	ARY Aurum Plus (private, 100%)	Sharjah	25
Do.	do.	Al Ghaith Gold (private, 100%)	Dubai	NA
Iron and steel:				
Direct-reduced iron		Emirates Steel Industries (ESI)	Abu Dhabi	1,600 ^P
Do.		Al Nasser Industrial Enterprises LLC	do.	250 ^P
Steel:				
Billet		Emirates Steel Industries (ESI)	do.	1,500 ^P
Do.		Al Nasser Industrial Enterprises LLC	do.	220 ^P
Wire rod		Emirates Steel Industries (ESI)	do.	480 ^P
Rebar		do.	do.	620 ^P
Do.		Al Nasser Industrial Enterprises LLC	do.	90 ^P
Do.		Essar Steel-India	Hamriyah Free Zone, Sharja	1,000 ^P
Do.		Metalloinvest-Russia	do.	1,000 ^P
Do.		Union Iron & Steel Company LLC	Abu Dhabi	500 ^P
Do.		Conares Metal Supply Ltd.	Dubai	400 ^P
Do.		Star Steel International LLC	Dubai, Jebel Ali; Sharjah, Hamriya Free Zone	360 ^P
Natural gas, liquefied		Abu Dhabi Gas Liquefaction Company Ltd.	Das Island	5,149
Petroleum:				
Crude	thousand 42-gallon barrels per day	Abu Dhabi Company for Onshore Oil Operations [Abu Dhabi National Oil Co. (Adnoc), 60%; BP p.l.c., 9.5%; Exxon Mobil Corp., 9.5%; Royal Dutch Shell Group, 9.5%; Total S.A., 9.5%; Participations and Explorations Corp., 2%	Onshore Abu Dhabi oilfields, including the Asab, the Bab, the Bu Hasa, the Jarn Yaphour, the Sahil, the Shah, Abu Al Bukhoosh, and the Arzanah fields	1,300
Do.	do.	Abu Dhabi Marine Operating Co. [Abu Dhabi National Oil Co. (Adnoc), 60%; BP p.l.c., 14.67%; Total S.A., 13.33%; Japan Oil Development Corp., 12%]	Offshore Abu Dhabi oilfields, including the Umm Sharif and the Zakum fields	600
Do.	do.	Zakum Development Co. [Abu Dhabi National Oil Co. (Adnoc), 63.36%; ExxonMobil Abu Dhabi Offshore Petroleum Company Ltd., 24.64%; Japan Oil Development Corp., 12%]	Offshore Abu Dhabi oilfields including, the Satah, the Umm Al-Dalkh, and the Upper Zakum fields	518

See footnotes at end of table.

TABLE 2—Continued
 UNITED ARAB EMIRATES: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Petroleum—Continued				
Crude—Continued	thousand 42-gallon barrels per day	Dubai Petroleum Co. (100%)	Dubai oilfields, including the Margham, the Falah, the Fateh, the Rashid, and the S.W. Fateh fields	100
Do.	do.	Ras Al Khaima Gas Commission	Ras Al Khaimah oilfields, including the Saleh fields	1
Do.	do.	BP p.l.c. and Crescent Petroleum Company Inc.	Sharjah oilfields, including the Kahaif, the Saja, the Moveyid, and the Mubarek fields	50
Refined products	do.	Abu Dhabi Oil Refining Co. [Abu Dhabi National Oil Co. (Adnoc), 100%]	Ruwais refinery, Ruwais, Abu Dhabi	350
Do.	do.	Emirates National Oil Company Ltd. (Investment Corporation of Dubai, 100%)	Jebel Ali refinery, Jebel Ali, Dubai	120
Do.	do.	Abu Dhabi Oil Refining Co. [Abu Dhabi National Oil Co. (Adnoc), 100%]	Abu Dhabi refinery, Umm Al Nar, Abu Dhabi	150
Do.	do.	Sharjah Oil Refining Co. F.Z.C. (FAL Group, 100%)	Sharjah refinery, Hamriyah Free Trade Zone	71
Do.	do.	Inactive refinery, formerly operated by Metro Oil Corp.	Fujairah	90
Silver, refined	metric tons	Emirates Gold (private, 100%)	Dubai	100

^pPreliminary. Do., do. Ditto. NA Not available.