

2008 Minerals Yearbook

JORDAN

THE MINERAL INDUSTRY OF JORDAN

By Mowafa Taib

Jordan was a major producer of bromine, phosphate rock, and potash in 2008. It was the fourth ranked producer of bromine, the seventh ranked producer of phosphate rock, and the ninth ranked producer of potash in the world. Jordan accounted for about 18% of the bromine produced in the world in 2008 (excluding United States output), and 3.6% of the world production of both phosphate rock and potash. Other mineral commodities that were produced in Jordan included cement, clay, fertilizer, kaolin, limestone, pozzolanic material, refined petroleum products, silica sand, steel, and zeolitic tuff (Apodaca, 2009; Jasinski, 2009a, b).

Minerals in the National Economy

In 2008, the mining and quarrying activities in Jordan, at current prices, were valued at \$974 million,¹ or 4.9% of the country's gross domestic product (GDP) compared with \$407 million, or 2.5% of the GDP, in 2007. The manufacturing sector, which included production of cement, fertilizer, iron and steel, and refined petroleum products, was valued at \$3.3 billion (about 16.6% of the GDP) compared with \$2.6 billion (15.7% of the GDP) in 2007. Mineral extraction and quarrying was responsible for 11.5% of Jordan's industrial production in 2008 compared with 10.3% in 2007. It included phosphate rock production (5.5%), potash production (5.4%), and hydrocarbon production and quarrying of stone (about 0.3% each). Refined petroleum accounted for 17.7% of Jordan's industrial production; fertilizer, 11.2%; cement, 5.1%; and iron and steel, 3.9% (Central Bank of Jordan, 2009, p. 83, 86).

Government Policies and Programs

The Natural Resources Authority (NRA) was the Government agency responsible for making mineral exploration policy, and for identifying and evaluating mineral resources of potentially high commercial value for investors. The NRA was recently restructured to promote enterprise and bring external and internal investment to the country's mining activity. In 2007, the NRA issued 1,638 mineral export permits, 254 quarrying licenses, and 27 exploration licenses. In 2008, NRA issued 33 exploration permits, which cover an area of 70 square kilometers (km²), for 8 minerals and mineral-related material, including 10 export permits for gypsum, 8 for limestone, 5 for travertine, 3 each for iron ore and pozzolan, 2 for kaolin, and 1 each for clay and volcanic tuff. The NRA issued 5 new mining licenses, which cover about 9 km², and 1,450 export permits during 2008. Oil shale exploration was one of the NRA's top priorities. The NRA had previously identified 23 shallow and deep oil shale deposits in the country that were estimated to hold more than 40 billion metric tons of shale oil. Jordan was the

eighth ranked country in the world in terms of the size of its oil shale reserves (Natural Resources Authority, 2006, p. 6; 2008a, p. 34; 2009, p. 21-22).

Production

In 2008, there were notable increases in the production of bromine, calcium carbonate, cement, kaolin, petroleum, phosphate rock, potash, pozzolanic material, salt, travertine, and zeolite tuff. There were also significant decreases in the production levels of aluminum fluoride, basalt, feldspar, gypsum, natural gas, phosphoric acid, and sulfuric acid (table 1).

In 2008, phosphate rock production was 6.27 million metric tons (Mt), which was 13% more than in 2007. This significant increase reversed the downward trend during 2006 and 2007 and returned the country to production levels similar to those achieved in 2004 and 2005. Similarly, potash production increased to 2.0 Mt in 2008, which was 11% more than the 1.8 Mt produced in 2007. In 2008, oil production from the Hamzeh oilfield, which was Jordan's only active oilfield, increased by 82% to 15,600 barrels (bbl) from 8,600 bbl produced in 2007. Natural gas production from the Risha gasfield in 2008 was about 0.6 million cubic meters (20.3 million cubic feet), which was 4% less than in 2007 (table 1).

Structure of the Mineral Industry

Arab Potash Co. Ltd. (APC) and Jordan Phosphate Mines Co. p.l.c. (JPMC) and their subsidiaries dominated Jordan's mineral industry in 2008. Both companies had mixed ownership that included both domestic and international private and public investors. APC shareholders included Potash Corporation of Saskatchewan Inc. of Canada (28%); Jordan's Ministry of Finance (26.9%); Arab Mining Co., which was an Arab League economic establishment (20%); Islamic Development Bank, which was an international donor organization based in Saudi Arabia (5.2%); the Government of Iraq (4.7%); Libyan Arab Foreign Investment Co. (4.1%); Kuwait Investment Co. (3.9%); Social Security Corp. of Jordan (3.8%); and others (3.4%). The main shareholders of JPMC as of yearend 2008 were Kamil Holding Ltd. (37.0%), Jordan's Ministry of Finance (26.3%), Social Security Corp. of Jordan (16.0%), the Government of Kuwait (9.3%), Passport Global Mater Fund SPCL Ltd. (2.7%), and Islamic Development Bank (1.4%) (Arab Potash Co. Ltd., 2009, p. 38; Jordan Phosphate Mines Co. p.l.c., 2009, p. 32).

JPMC employed 3,816 people in 2008; about 30% of the employees were stationed at the Eshidiya Mine, 29% were stationed at the Export Department and the industrial fertilizer complex at Aqaba Port, 20% were at the Al-Hassa Mine, 10% were at the Al-Abyad Mine, 9% were at the headquarters in Amman, and 2% were at the Russiefa Mine. In 2008, APC had 1,956 employees; 88% of them worked at the Safi plant, 8% were at the headquarters in Amman, and 4% were at Aqaba Port

¹Where necessary, values have been converted from Jordanian dinar (JD) to U.S. dollars (US\$) at the rate of JD0.714=US\$1.00.

(Arab Potash Co. Ltd., 2009, p. 32; Jordan Phosphate Mines Co. p.l.c., 2009, p. 55).

Jordan Lafarge Cement Factories Co. P.S.C. (JCFC) had been the sole producer and distributor of cement in the Kingdom since 1951. JCFC was majority owned by Lafarge, which held 50.28% of the total shares, and private Jordanian investors, who owned the remaining shares. The company held a monopoly on the cement market of Jordan until 2008 when Jordanian investors and producers from Egypt, Kuwait, and Saudi Arabia started projects to build several cement factories throughout Jordan (International Cement Review, 2009).

In 2008, Jordan Steel Co. p.l.c. became the sole owner of Consolidated Jordanian Iron and Steelworks Co. after increasing its interest to 100% from 50%, which was achieved by a 51.1% increase in Jordan Steel's capital (Jordan Steel Co. p.l.c., 2008).

Mineral Trade

In 2008, the total value of merchandise exports, which accounted for 5.5% of the gross domestic product (GDP) of Jordan, increased by about 36% compared with that of 2007, which was 4.1% of the GDP. Fertilizer, phosphate rock, and potash exports were the major commodities that made up Jordan's exports whereas crude oil and petroleum products and iron and steel were the major categories of Jordan's imports. In 2008, potash exports accounted for 12.4% of total exports compared with 7.1% in 2007. Exports of fertilizer accounted for 9.5% of Jordan's exports in 2008 compared with 6.8% in 2007; and phosphate rock and phosphoric acid exports accounted for 8.4% and 4.0% of total exports in 2008 compared with 4.3% and 1.6% in 2007, respectively.

In 2008, the total value of merchandise imports, which represented 10.6% of the GDP, increased by 23% compared with the value in 2007, which was 8.6% of the GDP. The growth in merchandise imports included a 21.8% increase in the category of mineral fuels, lubricants, and related materials, and a 5.1% increase in iron and steel imports (Natural Resources Authority, 2008b, p. 15; Central Bank of Jordan, 2009, p. 67, 69, 86).

In 2008, phosphate rock exports were about 4 Mt, which was 10% more than exports in 2007. Exports of diammonium phosphate (DAP), which were largely received by India, decreased to 612,000 metric tons (t) in 2008 from 642,000 t in 2007. Similarly, exports of phosphoric acid declined to 38,000 t from 50,000 t. The destination of Jordan's phosphate rock exports were India, Indonesia, Japan, Korea, the Netherlands, and Taiwan (Jordan Phosphate Mines Co. p.1.c., 2009, p. 13-16, 28).

About 48% of the potash produced by APC was exported by way of Aqaba Port; 9.7% was used by the local market; 4.7% was consumed by Arab Fertilizers and Chemical Industries Ltd. (KEMAPCO); and 1.8% was used by Nippon Jordan Fertilizer Co. (NJFC). The major importing countries of Jordanian potash were India (43%), Malaysia (12%), China (11%), Indonesia (4%), and Egypt and Japan (3% each) (Arab Potash Co. Ltd., 2009, p. 22).

In 2008, there was a 4.4% decline in the demand for cement in Jordan's local market owing to the slowdown in the activity of the construction sector. This decline enabled JCFC to export 355,000 t of cement; of this amount, 87.7% was received by

Syria, 11.6% by Iraq, and 0.6% by Sudan (Jordan Lafarge Cement Factories Co. P.S.C., 2009, p. 10).

Commodity Review

Industrial Minerals

Bromine.—Jordan Bromine Co. (JBC) was a 50-50 joint venture between Albemarle Corp. of the United States and APC. JBC, which began production in 2003, produced more than 1 Mt of bromine in 2008, which was a 24% increase compared with that of 2007. Bromine products were sold through Albemarle based on a long-term marketing agreement between APC and Albemarle under which APC received 30% of JBC's profits and endured 50% of its losses (Al-Arabi Investment Group, 2009, p. 14; Arab Potash Co. Ltd., 2009, p. 28).

Cement.—JCFC operated two cement plants; one was located at Fuheis, near Amman, and the other was located in southern Jordan at Ar-Rashadiya. JCFC, which had its own terminal at Aqaba, was responsible for 97% of the Kingdom's cement production. The remaining 3% was produced by the Arab Company for White Cement Industry (ACWCI). ACWCI was a state-owned company that produced 130,000 metric tons per year (t/yr) of white cement. ACWCI was a joint venture of Syrian and Jordanian Government-owned investment companies, including the Syrian Jordanian Company for Industry, the General Company for Cement and Building Materials of Syria, Jordan Investment Corp., and the Social Security Corp. of Jordan (Arab Company for White Cement Industry, 2009).

The high cost of fuel, which accounted for 70% of the total production cost in 2008, triggered JCFC to search for alternative sources of energy to power its cement plants. The company conducted studies to reduce cost and found out that the company could reduce its production costs by 20% if it were to replace 25% of the fuel oil it used with shale oil, which is abundantly available in many locations in Jordan (International Cement Review, 2009).

In May 2008, the construction of the first phase of the Northern Region Cement plant began with an initial capacity of 1 million metric tons per year (Mt/yr). The plant would produce three types of cement: ordinary portland cement, pozzolan cement, and sulfate-resistant cement. In August 2007, Arabian Cement Co. of Saudi Arabia contracted KHD Humbold Wedag International Ltd. of Germany to build a 2-Mt/yr-capacity plant at Qatranah near the city of Karak. Modern Cement and Mining Co. (a subsidiary of Manaseer Group for Industries and Commercial Investments of Jordan) contracted FLSmidth & Co. A/S of Denmark to supply the design and equipment for the cement plant being built northeast of Qatranah about 80 kilometers (km) south of Amman. The plant would have a production capacity of 1.2 Mt/yr of clinker and would begin producing portland cement, pozzolanic cement, and sulfate-resistant cement in 2010.

Al-Rajhi Investment Co. of Saudi Arabia began building two cement plants with a total capacity of 4 Mt/yr; one of the plants was located at Mafraq near the Iraqi border, and the other was located at Qatranah. Additional plans to build

cement plants in Jordan were announced by Al-Rijal Investment of Kuwait, Cimentos de Portugal S.G.P.S. S.A. (Cimpor), Jordanian-Kuwaiti Holding Co., and Jordan Investment Trust p.l.c. Because of these projects, cement production capacity would more than double by 2011 to 10 Mt/yr (International Cement Review, 2009).

Phosphate Rock.—Sixty-one percent of the phosphate rock produced in Jordan was from the Eshidiya Mine, which is located in the south of Jordan about 125 km northeast of Aqaba Port and which had an estimated 1,321 Mt of proven, probable, and possible reserves. The other two mines—the Al-Abyad Mine and the Al-Hassa Mine—contributed about 19% of total phosphate rock production each. Production from the Russeifa Mine accounted for 0.7%. Rock phosphate was transported either by trucks (60%) or by railroad (40%). JPMC planned to build an exclusive phosphate exporting port at Agaba on the Red Sea. The new port, which was being planned in coordination with Agaba Development Corp. and the Agaba Special Economic Zones Authority, was scheduled to be completed in 2012. JPMC was evaluating the feasibility of establishing a 200-t/yr-capacity phosphoric acid plant in Indonesia, which would be jointly operated with state-owned PT Petrokimia Gresik of Indonesia (Jordan Phosphate Mines Co. p.l.c., 2009, p. 10).

In 2008, Jordan Abyad Fertilizers and Chemicals Co. P.S.C. (JAFCCO) announced a \$90 million fertilizer production expansion project at the Agaba Industrial Complex. The project was expected to increase diammonium phosphate production capacity to 1 Mt/yr from 650,000 t/yr. JAFCCO moved forward with construction of the company's fertilizer manufacturing complex that was begun in August 2007. The complex, which was expected to commence production in April 2010, is located at Al-Abyad Valley near the Al-Abyad phosphate rock mine. It was to include five production lines for the manufacturing of calcium chloride, dicalcium phosphate, potassium sulfate, sulfuric acid, and triple superphosphate. JAFCCO was a partnership among JAFCCO Bahrain (42.8%), JMPC (15%), Venture Capital Bank (14.4%), Al-Fares Investments (12.8%), Arab Mining (10%), and Sea Field Offshore Co. (5%) (Arab Mining Co., 2009, p. 39).

Jordan Indian Fertilizer Co., which was a joint venture of Indian Farmers Fertilizers Cooperative of India (52%) and JPMC (48%) moved forward with building a plant at the Eshidiya Mine; the plant was expected to produce 475,000 t of phosphoric acid and 1.5 Mt of sulfuric acid annually and would begin production in late 2011 at a cost of \$570 million. A similar project had been discussed with Mitsubishi Corp. of Japan to produce 325,000 t of phosphoric acid from a second plant also to be located in Eshidiya (Jordan Phosphate Mines Co. p.l.c., 2009, p. 55).

Potash.—APC proceeded with expansion of its operations, which was aimed at increasing its production capacity by 450,000 t to reach a total annual production capacity of 2.5 Mt of potash. APC also intended to increase its compaction capacity by 250,000 t and its storage capacity at the Aqaba Port and the Safi facility by 115,000 t. The cost of the expansion project was estimated to be \$280 million, and it was scheduled to be completed by yearend 2009.

Mineral Fuels and Related Materials

Natural Gas and Petroleum.—Jordan has historically depended heavily on such neighboring countries as Iraq and Saudi Arabia to satisfy its increasing consumption of oil products, which was estimated to be 108,000 barrels per year. In 2008, the NRA signed several memorandums of understanding and production-sharing agreements with several companies to invest in oil and gas exploration in Jordan and in oil shale exploitation. These companies included Global Petroleum Ltd. of Australia, Petrel Resources p.l.c. of Ireland, Porosity Ltd. of Jordan, Sonoran Energy Inc. of the United States, and Universal Energy Corp. of India (Natural Resources Authority, 2009, p. 25).

A preliminary agreement between NRA and BP p.l.c. of the United Kingdom was signed to increase gas production from the Risha gasfield located in the eastern part of the country near the border with Iraq. Production from the Risha gasfield began in 1989 and its current production (2008) was 0.6 million cubic meters per day (210 million cubic meters per year) after peaking at 1 million cubic meters per day in 2003. The deal, which would allow BP to produce and export gas from Jordan after forming a joint venture with National Petroleum Co. of Jordan, was expected to be finalized in 2009 (Middle East Economic Digest, 2009).

In May 2008, the Natural Resources Authority signed a major concession agreement with Jordan Oil Shale Co. B.V. (a subsidiary of Royal Dutch Shell p.l.c. of the Netherlands) to explore for oil from oil shale resources in Jordan, which had been estimated to be more than 40,000 Mt. The agreement, which was ratified by the Parliament in July 2008, covered a 22,000-km²-area and could produce thousands of barrels per day (bbl/d) of oil. Under this agreement, Jordan Oil Shale Co. would get 60% of any oil or gas produced up to 10,000 bbl/d of oil or oil equivalent. The share after 10,000 bbl/d would be scaled down to 35% of oil production that exceeds 100,000 bbl/d (Oil & Gas Journal, 2008; Rigzone.com, 2008).

Uranium.—Jordan's Committee for Nuclear Strategy planned to produce 30% of the country's electricity needs by 2030 and envisaged beginning energy generation from a nuclear powerplant by 2015. Therefore, the Government held talks with the Governments of France, Romania, Russia, the United Kingdom, and the United States regarding this issue. In December 2008, the Government signed a memorandum of understanding with Korea Electric Power Corp. of the Republic of Korea to conduct a feasibility study to build a nuclear powerplant. Another agreement between the Jordan Atomic Energy Commission and the U.S. Department of Energy (DOE) was signed to build a radioactive waste facility, which would be designed and built by Pacific Northwest Laboratory of the DOE. Another related agreement was signed between Jordan Nuclear Regulatory Commission and the DOE's National Nuclear Security Administration on December 16, 2008, to prevent smuggling of nuclear and radioactive material into Jordan by installing radiation sensors and other related equipment at the Port of Aqaba and other border crossing points (U.S. National Nuclear Security Administration, 2008; World Nuclear News, 2009).

JMPC, in coordination with Jordan Nuclear Energy Commission, contracted an unnamed international company in

June 2008 to conduct a feasibility study to determine the best industrial method to recover the uranium present in phosphate rock. Phosphoric acid produced at the JPMC fertilizer plant would be used for uranium extraction given that uranium concentration is in the range of 50 to 100 parts per million. Extracted uranium would be used to make the yellow cake used as a fuel component in the nuclear powerplants (Jordan Phosphate Mines Co. p.l.c., 2008). The NRA estimated the uranium reserves at four desert locations in Jordan to be 80,000 t and the commercial uranium quantities in the phosphate rock reserves to be 140,000 t (Ragheb and Khasawneh, 2010, p. 15).

Outlook

Jordan, which does not have significant oil and gas resources, is planning to diversify its energy portfolio to meet its national energy needs by building a nuclear powerplant by 2015 and by beginning to mine its abundant oil shale deposits. Jordan plans to maintain and perhaps increase the volume of bromine, fertilizer, phosphate rock and potash production in 2009 and beyond once the expansion projects currently underway are completed.

References Cited

- Al-Arabi Investment Group, 2009, Arab Potash Company initiation coverage report: Amman, Jordan, Al-Arabi Investment Group, March, 27 p.
- Arab Company for White Cement Industry, 2009, Our company: Arab Company for White Cement Industry. (Accessed June, 29, 2009, at http://www.acwci.com/our_company.htm.)
- Arab Mining Co., 2009, Thirty fourth's board of directors report 2008: Amman, Jordan, Arab Mining Co., 68 p.
- Arab Potash Co. Ltd., 2009, Annual report—2008: Amman, Jordan, Arab Potash Co. Ltd., 80 p.
- Apodaca, L.E., 2009, Bromine: U.S. Geological Survey Mineral Commodity Summaries 2009, p. 36-37.
- Central Bank of Jordan, 2009, Annual report 2008: Amman, Jordan, Central Bank of Jordan, 162 p.

- International Cement Review, 2009, Jordan's new open market: Tradeship Publications Ltd., February, p. 30-36.
- Jasinski, S.M., 2009a, Phosphate rock: U.S. Geological Survey Mineral Commodity Summaries 2009, p. 120-121.
- Jasinski, S.M., 2009b, Potash: U.S. Geological Survey Mineral Commodity Summaries 2009, p. 124-125.
- Jordan Lafarge Cement Factories Co. P.S.C., 2009, Annual report 2008: Jordan Lafarge Cement Factories Co. P.S.C., 13 p.
- Jordan Phosphate Mines Co., p.l.c., 2008: JPMC signs an agreement for uranium extraction: Amman, Jordan, Jordan Phosphate Mines Co. p.l.c. press release, June 18, 1 p.
- Jordan Phosphate Mines Co. p.l.c., 2009: Fifty fifth annual report 2008: Amman, Jordan, Jordan Phosphate Mines Co. p.l.c., 81 p.
- Jordan Steel Co. p.l.c., 2008, About Jordan Steel: Jordan Steel Co. p.l.c. (Accessed August 17, 2009, at http://www.jordansteelp.l.c..com/about_js.asp.)
- Middle East Economist Digest, 2009, Energy major signs three-year contract for Risha gas field: Middle East Economic Digest, v. 53, no. 32, August 7, p. 10.
- Natural Resources Authority, 2006, Oil shale: Amman, Jordan, Natural Resources Authority, 23 p.
- Natural Resources Authority, 2008a, Annual report 2007: Amman, Jordan, Natural Resources Authority, 57 p.
- Natural Resources Authority, 2008b, Mining sector performance during 2007 compared with the last four years: Amman, Jordan, Natural Resources Authority, 39 p.
- Natural Resources Authority, 2009, Annual report 2008: Amman, Jordan, Natural Resources Authority, 41 p.
- Oil & Gas Journal, 2008, Shell sign oil shale agreement: Oil and Gas Journal, May 18. (Accessed June 22, 2009, at http://www.ogj.com/ogj/en-us/index/article-display.articles.oil-gas-journal.drilling-production.jorndan-sign-oil-shale-agreement.html.)
- Ragheb, Magdi, and Khasawneh, Mohammed, 2010, Uranium fuel as a byproduct of phosphate fertilizer production: International Nuclear and Renewable Energy Conference (INREC10), 1st, Amman, Jordan, March 21-24, 2010, Presentation, 15 p. (Accessed May 10, 2010, at https://netfiles.uiuc.edu/mragheb/www/Uranium Fuel as byproduct of phosphate fertlilizer production.pdf.)
- Rigzone.com, 2008, Jordan Parliament approves Shell oil exploration: Rigzone.com. (Accessed July 17, 2009, at http://www.rigzone.com/news/article.asp?a id=78304.)
- U.S. National Nuclear Security Administration, 2008, U.S. and Jordan sign agreement to prevent smuggling of nuclear and radioactive material: U.S. National Nuclear Security Administration news release, December 16, 1 p.
- World Nuclear News, 2009, USA to construct Jordanian storage facility: World Nuclear News, March 9. (Accessed July 1, 2009, at http://www.world-nuclear-news-or/pring/aspx?id=24797.)

 $\label{eq:table 1} TABLE~1\\ JORDAN: PRODUCTION~OF~MINERAL~COMMODITIES^1$

(Thousand metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
Bromine	46	90	95	85	106
Calcium carbonate	477	320	304	328	415
Cement, hydraulic	3,908	4,046	3,967	4,138	4,284
Clay:					
Common clay	608	618	643	948	762
Kaolin	217	168	113	101	181
Feldspar	13	1	11	10	3
Fluorine, aluminum fluoride	10	9	12	11	9
Gypsum	135	344	334	288	232
Lime	7	15	12	12	15
Limestone, pure		370	448	482	1,840
Magnesia					

See footnotes at end of table.

$\label{total loss} \mbox{TABLE 1---Continued} \\ \mbox{JORDAN: PRODUCTION OF MINERAL COMMODITIES}^1$

(Thousand metric tons unless otherwise specified)

Commodity		2004	2005	2006	2007	2008
Natural gas, dry	million cubic meters	294	241	251	219 r	210
Petroleum:						
Crude	42-gallon barrels	10,372	8,540	10,047	8,578 ^r	15,604
Refinery products:			,	,	,	,
Liquefied petroleum gas	do.	1,299	1,369	1,451	1,245	1,250 e
Lubricants	do.	310	200	101	118	118 ^e
Gasoline	do.	4,938	5,280	5,530	5,787	5,790 e
Jet fuel	do.	1,578	2,569	2,385	2,304	2,300 e
Kerosene	do.	1,252	1,786	1,016	1,075	1,080 e
Distillate fuel oil	do.	9,116	10,407	9,878	9,047	9,050 e
Residual fuel oil	do.	10,097	9,764	8,781	8,024	8,020 e
Asphalt	do.	1,150 e	1,100 e	1,014	942	942 ^e
Total	do.	29,700 e	32,500 e	30,156	28,542	28,500 e
Phosphate:						
Phosphate rock, mine output:						
Gross weight		6,188	6,375	5,805	5,552	6,266
P ₂ O ₅ content		1,980	2,040	1,860	1,780	2,002
Phosphatic fertilizers		887	800	882	851	802
Phosphoric acid		606	587	554	480	445
Potash:						
Crude salts		1,941	1,829	1,699	1,796	2,005
K ₂ O equivalent		1,180	1,115	1,036	1,090	1,223
Salt		29	30	29	17	25
Sand: ²						
Silica		73	229	392	628	23,342
Other		27,088	23,375	4,150	4,370	4,400 e
Steel: ^e						
Crude		140	150	150	150	150
Semimanufactured		310	350	360	360	360
Stone:						
Basalt	thousand cubic meters	7		9	21	5
Dimension:						
Worked	thousand meters	6,507	6,071	5,688	5,657	6,053
Marble	do.	28	44	38	41	44
Gravel and crushed rock:						
Basalt	thousand cubic meters	7		9	3 ^r	1
Granite	do.		4	4	4	4
Marble	do.	28	44	38	27 ^r	29
Other	do.	15	16	14	15	14
Pozzolanic material		455	424	552	495	538
Travertine		4	11	9	3	6
Zeolite tuff		3	2	4	2	11
Sulfuric acid:						
Gross weight	thousand metric tons	1,103	1,047	1,092	1,022	933
S content	do.	361	342	357	334	305

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. do. Ditto. -- Zero.

¹Table includes data available through August 31, 2009.

²Reported as cubic meters and converted to metric tons.

$\label{eq:table 2} \text{JORDAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2008}$

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity 1
Aluminum fluoride	Jordan Phosphate Mines Co. p.l.c. (JPMC) (Kamil Holding Ltd., private, 37%; Jordan Finance Ministry, 26.3%; Social Security Corp., 16%; Kuwait Investment Corp., 9.3%; Passport	Aqaba	14
	Global Master Fund SPC Ltd., 2.8%; Islamic Development Bank, 1.4%)		
Bromine	Jordan Bromine Co. [Arab Potash Co. Ltd. (APC), 50%, and Albemarle Corp., 50%]	al-Safi	10
Cement	Jordan Cement Factories Co. Ltd. (LaFarge Group, 50%)	Fuheis and Ar-Rashadia	4,600
Do.	Arab Company for White Cement Industry	Amman	130
Feldspar	General Mining Co. Ltd.	Al-Jaishiah	10
Gypsum	Al-Nisr/Ali Manaseer	Mujib	89
Do.	Jordan Lafarge Cement Factories Company P.S.C.	River Zarqa	73
Do.	Public Mining Co. Ltd.	Mujib	68
Do.	Al-Nasr Mining Establishment	do.	31
Do.	Falahat Mining Establishment	do.	25
Do.	Shaker Al-Talib Establishment	Subeihi	15
Do.	Al-Noor Mining Co.	Mujib	11
Kaolin	Jordanian Company for Mining and Processing of Kaolin and	Qanasieh	216
	Feldspar		
Do.	Al-Faori Enterprise for Mining	Al-Adasieh	110
Do.	Public Mining Company Ltd.	Fuahais	38
Do.	do.	Batn el-Ghoul	31
Magnesia ²	Jordan Magnesia Co. [Arab Potash Co. Ltd. (APC), 55.3%]	al-Safi	24
Natural gas million cubic meters Petroleum:	National Petroleum Co. (Government, 100%)	Risha	210
Crude thousand 42-gallon barrels	do.	Hamza	16
Refined do. Phosphate:	Jordan Petroleum Refinery Co. Ltd. (Government, 100%)	Zarqa	36,500
Phosphate rock	Jordan Phosphate Mines Co. p.l.c. (JPMC) (Kamil Holding	Al-Abiad, Al-Hassa,	7,000
i nospitate rock	Ltd., private, 37%; Jordan Investment Corp., 29%;	Eshidiya, and Russeifa	7,000
	Social Security Corp., 14%; Kuwait Investment Corp. 9%)	Mines	
Phosphatic fertilizers	Jordan Phosphate Mines Co. p.l.c. (JPMC)	Aqaba	650
Do.	Nippon Jordan Fertilizer Co. [Asahi Industries Company Ltd. 10%;	Eshidiya	300
D0.	Mitsubishi Corp., 10%; Mitsubishi Chemicals Corp., 10%;	Esmurya	300
	Zen-Noh, 30%; Arab Potash Co. Ltd. (APC), 20%;		
Phosphoric acid	Jordan Phosphate Mines Co. p.l.c. (JPMC), 20%]	Agaha	350
Do.	Jordan Phosphate Mines Co. p.l.c. (JPMC) Indo-Jordan Chemicals Co. [Southern Petrochemical	Aqaba Eshidiya	225
D0.	-	Estildiya	223
	Industries Corp. Ltd., 52.2%, and Jordan Phosphate Mines Co. p.l.c. (JPMC), 34.8%		
D-4l-	1 \ // 3	-1 C-E	1.050
Potash	Arab Potash Co. Ltd. (APC) (Potash Corporation of al-Safi		1,950
	Saskatchewan Inc., 28%; Government, 26.9%;		
Data animos mituata	Arab Mining Co., 20%) Arab Fertilizers and Chemicals Industries Ltd.	A1	150
Potassium nitrate		Aqaba	150
D1ii-1	[Arab Potash Co. Ltd. (APC), 100%]	T-1 Dl	250
Pozzolanic material	Jordan Lafarge Cement Factories Co. P.S.C.	Tel Remah	350
Do.	do.	Rashahdieh	150
Salt	Arab Potash Co. Ltd. (APC), 100%	al-Safi	17
Sand, silica	Middle East Regional Development Enterprises	Ras al-Naqab	530
Do.	Mahmoud Habahbeh and Sons Quarry	do.	28
Do.	Al-Rehab for Industrial Services and Trading do.		27
Do.	Al-Fares for Silica Sand Mining	do.	17

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

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity ¹
Steel:			
Crude	Jordan Steel Co. p.l.c.	Amman	360
Semimanufactured	do.	do.	300
Do.	National Steel Industry Co.	Awajan	100
Do.	Other steel producers	NA	506
Sulfuric acid	Jordan Phosphate Mines Co. p.l.c. (JPMC)	Aqaba	1,100
Do.	Indo-Jordan Chemicals Co.	Eshidiya	660

Do., do. Ditto. NA Not available.

¹Estimates for feldspar, gypsum, kaolin, pozzolanic material, and silica sand producers based on maximium production for 1 year between 2000 and 2007.

²Shut down in 2004.