



# 2006 Minerals Yearbook

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## SUDAN

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# THE MINERAL INDUSTRY OF SUDAN

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In Sudan, rising production of crude petroleum in recent years has substantially increased the mineral sector's influence on the national economy. Sudan was not a globally significant producer or consumer of mineral commodities in 2006. Investment in Sudan's petroleum and petrochemical industries by U.S. individuals or organizations was banned by Executive Order 13412 issued by the President of the United States in October 2006. The alleged use of revenues from petroleum sales to finance operations in the Darfur conflict constituted one of the reasons for issuing the Order (Reuters Ltd., 2006).

## Minerals in the National Economy

In 2006, the petroleum sector accounted for 15.2% of the gross domestic product; manufacturing, 6.9%; and mining and quarrying, 0.6%. The value of output in the petroleum sector grew by 10% in 2006, and mining and quarrying, by 5%. Crude petroleum exports amounted to \$4.7 billion, or 83% of total exports; petroleum products, 7%; and gold, 1% (Bank of Sudan, 2007).

## Production

In 2006, the production of crude petroleum increased by 25%, and refined petroleum products, by 23%. Cement output declined by 39%, and gold, by 13% (table 1).

## Structure of the Mineral Industry

Sudan's crude petroleum was produced by joint ventures of Chinese, Indian, Malaysian, and Sudanese state-owned companies. Most of the petroleum refineries were also state-owned; the Khartoum Oil Refinery was a joint venture between Chinese and Sudanese state-owned companies. The Government owned a 56% share in the Hassai gold mine; LaMancha Resources Inc. purchased the 40% share held by Ariab Mining Company Ltd. in early 2006. The cement plants were privately owned (La Mancha Resources Inc., 2007).

## Commodity Review

### Metals

**Gold.**—LaMancha produced 3,158 kilograms (kg) of gold at the Hassai Mine compared with 3,625 kg in 2005. Production declined in 2006 because of lower ore grades and gold recoveries from silico-baritic ores and the breakdown of equipment. In 2007, the company expected to produce about 3,400 kg of gold (La Mancha Resources Inc., 2007).

### Industrial Minerals

**Cement.**—In 2006, national cement production declined to 202,200 metric tons (t) from 331,200 t in 2005. Production at

Atbara decreased to 114,200 t in 2006 from 240,000 t in 2005 because of shutdowns for maintenance; production at Rabak decreased to 88,000 t from 91,100 t. Al-Rajhi Group of Saudi Arabia was conducting a feasibility study on increasing the capacity of the Atbara plant by 1.8 million metric tons per year (Mt/yr). Nile Cement Company Ltd. planned to increase the capacity of the Rabak plant to 500,000 metric tons per year (t/yr) from 150,000 t/yr and to build a new plant with a capacity of 1.1 Mt/yr. Star Cement of the United Arab Emirates was conducting a feasibility study on a new plant near Khartoum with a capacity of 660,000 t/yr (Middle East Economic Digest, 2006a-c; Bank of Sudan, 2007).

### Mineral Fuels

**Petroleum.**—In 2006, crude petroleum production increased to an estimated 158 million barrels (Mbbbl) from 126 Mbbbl in 2005 and 111 Mbbbl in 2004. The increase was attributable to higher production from Block 6 and the start of production in Blocks 3, 5A, and 7.

The Greater Nile Petroleum Operating Company [a joint venture of China National Petroleum Corp. (CNPC) (40%), Petronas Carigali Overseas Shd. Bhd. of Malaysia, (30%), ONGC Videsh Ltd. of India (25%), and Sudan Petroleum Company Ltd. (Sudapet) (5%)] produced crude petroleum at Blocks 1, 2, and 4 in south central Sudan. In 2006, production in Blocks 1, 2, and 4 declined to an estimated 316,000 barrels per day (bbl/d) from 328,000 bbl/d in 2005. Output was expected to increase to 318,000 bbl/d in 2007 before declining to 308,000 bbl/d in 2009 and 250,000 bbl/d in 2011 (Wesselink, 2006).

CNPC held Block 6, which was located to the northwest of Muglad. In 2006, production in Block 6 increased to an estimated 33,000 bbl/d from 18,000 bbl/d in 2005. Output was expected to increase to 69,000 bbl/d in 2007 and 92,000 bbl/d in 2009 before declining to 72,000 bbl/d in 2011 (Wesselink, 2006).

Blocks 3 and 7 in eastern Sudan were held by the Petrodar Consortium [CNPC (41%), Petronas (40%), Sudapet (8%), Gulf Petroleum Company of Qatar (6%), and the Al-Thani Group of Sudan (5%)]. In August 2006, production started in Blocks 3 and 7 at a rate of 150,000 bbl/d; output was expected to increase to 180,000 bbl/d in 2007 (Wesselink, 2006).

Blocks 5A and 5B were located in the Muglad Basin. Block 5A was held by White Nile Petroleum Operating Company [Petronas (68.9%), ONGC Videsh (24.1%), and Sudapet (7%)]; reserves at the Thar Jath field in Block 5A were reported to be 250 Mbbbl. Block 5B was held by Petronas (39%), Lundin Petroleum AB of Sweden (24.5%), ONGC Videsh (23.5%), and Sudapet (13%). In June 2006, production started in Block 5A at a rate of 40,000 bbl/d. Output was expected to increase to 50,000 bbl/d in 2007 and 54,000 bbl/d in 2009 before declining to 39,000 bbl/d in 2011 (Wesselink, 2006).

Kuwait Petroleum Corp., Marathon Oil Corp., and Total S.A. held Block B in southern Sudan. In December 2006, the central

Government announced that White Nile Ltd. of the United Kingdom, which had been granted the right to explore Block B by the governing authorities of Southern Sudan, would be forced to relinquish control to Total and its joint-venture partners (Dow Jones Newswire, 2006).

Block C, which is located to the southwest of Block 6 in western Sudan, was held by the Advanced Petroleum Company [Hi-Tech Petroleum of Sudan (65%), Sudapet (17%), the government of the State of Khartoum (10%), Heglieg Petroleum (8%)]. Cliveden Petroleum Company of Switzerland sold its 37% interest in Block C to High Tech Group because the companies drilled five dry wells in 2005 and 2006 (Africa Energy Intelligence, 2005; Wesselink, 2006).

Sudapak Operating Company [Zaver Petroleum Corp. Ltd. of Pakistan, 85%; Sudapet, 15%] held Block 9 in the vicinity of Khartoum; Block 11 in the States of Gezira, North Kordofan, Northern, and White Nile to the west of Block 9; and Block A in Southern Sudan near Blocks 1, 2, 5A, 5B, 7, and B. Block 14 in northwestern Sudan was held by the state-owned company PetroSA (Pty) Ltd. of South Africa and Sudapet. The Red Sea Petroleum Operating Company [CNPC, 35%; Petronas, 35%; Sudapet, 15%] held Block 15 on the Red Sea between Port Sudan and the border with Eritrea. At the end of 2006, Block 10 in the State of Gedara, Block 12B in the State of Darfur, and Block 13 on the Red Sea remained unawarded.

In 2006, Sudan's output of petroleum products increased to 31.6 Mbbbl from 25.6 Mbbbl in 2005. The Khartoum Oil Refinery, which was operated by CNPC, accounted for a majority of the country's refining capacity. In July, CNPC announced that it had increased the refinery's capacity to 100,000 bbl/d. In late 2005, the Government signed a joint-venture agreement with Petronas to develop a new refinery at Port Sudan with a capacity of 150,000 bbl/d. The refinery was expected to be completed in early 2009 (Middle East Economic Digest, 2006d; Peng, 2006).

## Outlook

Crude petroleum production could increase to 617,000 bbl/d in 2007 and 634,000 bbl/d in 2009 because of higher production in Blocks 3, 5, 6, and 7 before declining to 541,000 bbl/d in 2011 because of lower output from Blocks 1, 2, and 4 (Wesselink, 2006). The development of Block 12A depended on resolution of the conflict in Darfur. Cement production capacity could increase by as much as 3.9 Mt/yr; the production of other construction materials also could increase substantially. Little change was expected for chromite, gold, and silver production.

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TABLE 1  
SUDAN: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

Commodity <sup>2</sup>		2002	2003	2004	2005	2006
Cement, hydraulic	metric tons	204,800	271,900	307,100	331,200 <sup>r</sup>	202,200
Chromite, mine output, gross weight <sup>3</sup>	do.	14,000	37,000	26,000	21,654 <sup>r</sup>	22,000 <sup>e</sup>
Gold, mine output, Au content <sup>4</sup>	kilograms	5,239	5,106	5,000	3,625 <sup>r</sup>	3,158
Gypsum <sup>e</sup>	metric tons	4,540 <sup>5</sup>	13,304 <sup>5</sup>	14,000	14,000	15,000
Marble	cubic meters	22,000 <sup>5</sup>	23,000 <sup>r</sup>	24,000 <sup>r</sup>	24,000 <sup>r</sup>	26,000
<b>Petroleum:</b>						
Crude, including lease condensate	thousand 42-gallon barrels	90,200 <sup>r</sup>	98,500 <sup>r</sup>	111,000 <sup>r</sup>	126,000 <sup>r</sup>	158,000 <sup>e</sup>
<b>Refinery products:</b>						
Liquefied petroleum gas	do.	2,792	2,658	3,235	3,010 <sup>r</sup>	3,742
Gasoline	do.	7,546	7,318	8,109	7,827 <sup>r</sup>	9,717
Naphtha	do.	303	260	248	248 <sup>r</sup>	216
Jet fuel	do.	1,339	1,236	1,562	1,596 <sup>r</sup>	1,445
Kerosene	do.	259	282	294	340 <sup>r</sup>	320
Distillate fuel oil	do.	7,631	8,241	9,708	9,965 <sup>r</sup>	13,554
Residual fuel oil	do.	1,991	2,503	2,444	2,589 <sup>r</sup>	2,566
Total	do.	21,861	22,498	25,600	25,575 <sup>r</sup>	31,560
Salt <sup>e</sup>	metric tons	83,340 <sup>5</sup>	61,096 <sup>5</sup>	63,000 <sup>r</sup>	65,000 <sup>r</sup>	68,000
Silver <sup>e</sup>	kilograms	3,256 <sup>5</sup>	2,844 <sup>5</sup>	2,800 <sup>r</sup>	2,000 <sup>r</sup>	1,800
Steel, semimanufactured	metric tons	53,035	63,936	35,740	67,015 <sup>r</sup>	67,000 <sup>e</sup>

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised.

<sup>1</sup>Table includes data available through July 25, 2007.

<sup>2</sup>In addition to the commodities listed, the following are presumably produced although available information is inadequate to estimate output: clay and/or shale for cement manufacture (normally about 0.4 metric ton of clay and/or shale per metric ton of finished cement); limestone for cement manufacture (normally at least 1.25 metric tons per metric ton of finished cement), agriculture, lime manufacture, and construction aggregate and fill; other construction materials (clays, sand and gravel, stone, and others for local use); and mica.

<sup>3</sup>Presumed to be ores and concentrates with an estimated average grade of about 54% chromic oxide.

<sup>4</sup>Does not include artisanal output.

<sup>5</sup>Reported figure.

TABLE 2  
SUDAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2006

(Metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity
Cement		Al-Rahji Group	Plant at Atbara	400,000
Do.		Nile Cement Company Ltd.	Plant at Rabak	150,000
Chromite		Ingessana Hills Mines Corp.	Mine at Ingessana Hills	48,000
Gold	kilograms	Compagnie Miniere Or (Government of Sudan, 56%, and La Mancha Resources Inc., 40%)	Mine at Hassai	5,000
Gypsum		Sudanese Mining Corp. (Government, 100%)	Bir Eit Mine	15,000
Limestone		Atbara Cement Company Ltd.	Mine at Atbara	500,000
Do.		Nile Cement Company	Mine at Rabak	200,000
Mica		Sudanese Mining Corp. (Government, 100%)	Mines at Sheriek	1,800
<b>Petroleum:</b>				
Crude	thousand 42-gallon barrels	Greater Nile Petroleum Operating Co. [China National Petroleum Corp. (CNPC), 40%; Petronas Carigali Overseas Shd. Bhd., 30%; ONGC Videsh Ltd., 25%; Sudan Petroleum Company Ltd. (Sudapet), 5%]	Blocks 1, 2, and 4	120,000
Do.	do.	Petrodar Consortium [China National Petroleum Corp. (CNPC), 41%; Petronas Carigali Overseas Shd. Bhd., 40%; Sudan Petroleum Company Ltd., 8%; Gulf Petroleum Company of Qatar, 6%; Al-Thani Group, 5%]	Blocks 3 and 7	73,300
Do.	do.	China National Petroleum Corp. (CNPC)	Block 6	14,600
Do.	do.	White Nile Petroleum Operating Co. [Petronas Carigali Overseas Shd. Bhd., 68.9%; ONGC Videsh Ltd., 24.1%; Sudan Petroleum Company Ltd. (Sudapet), 7%]	Block 5A	14,600
Refined	do.	Khartoum Oil Refinery [China National Petroleum Corp. (CNPC), 50%, and Sudan Petroleum Corp., 50%]	Refinery at Jali	36,500
Do.	do.	Port Sudan Refining Ltd. (Government, 100%)	Refinery at Port Sudan	9,100
Do.	do.	Government	Refinery at El Obeid	3,700
Do.	do.	Concorp Ltd.	Refinery at Shajirah	3,700
Do.	do.	Government	Refinery at Abu Jabra	730
<b>Steel:</b>				
Crude		Sudan Master Technology	Plant at Giad Industrial City	60,000
Rebar		do.	do.	150,000
Do.		Sudanese Steel Products Ltd. (subsidiary of Hafez Elsayad Barbary Ltd.)	Plant at Khartoum	150,000
Galvanized		do.	do.	20,000