## THE MINERAL INDUSTRY OF

# **SUDAN**

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In 1999 (the last year for which data were available), the gross domestic product for this nation of 29 million was estimated to be \$10.9 billion.\(^1\) Mineral production traditionally has made a negligible contribution to Sudan's economy. Initiation of commercial gold production in 1991 and production of crude oil, which significantly increased in 1999, however, cemented the mineral sector's influence on the national economy. Other mineral commodities produced in Sudan included asbestos, cement, chromite, gravel, gypsum, limestone, marble, mica, refined petroleum products, salt, and construction sand.

Sudan continued to carry a negative trade balance in 1999, which contributed to its large foreign debt. Total exports were estimated to be \$780 million in 1999 compared with \$596 million in 1998. Total imports were estimated to be \$1,412 million in 1999 compared with \$1,925 million in 1998 (Sundararajan and others, 1998, p. 9; Zavadjil and others, 2000, p. 29-31). In 1999, Sudan began to export and ceased to import crude oil, which resulted in the first decrease in the trade deficit since 1994. In 2000, Sudan ended importation of refined petroleum products, and the first petroleum products tanker, which carried 20,000 metric tons of Sudanese benzene, departed the terminal at Marsa al Bashayir near Port Sudan in June (Herald, 2000).

In recent years as gold prices have declined, increased gold exports have only maintained income from that sector (about \$50 million per year since 1995). The effect that the income received from gold exports made on the national economy was diluted after the exportation of crude oil began in September 1999 when the Government began to accrue about \$1 million per day from the petroleum sector. Oil exports were viewed as the means to reduce the trade deficit and to increase funds earmarked for development.

The Federal Government maintained jurisdiction over mineral operations. Mineral sector investments were subject to the Investment Encouragement Act for 1996. Exploration and production of oil and natural gas also were covered under the Petroleum Wealth Act, 1998. Exploration and production-sharing agreements (EPSA) formed the basis for all petroleum and natural gas contracts.

The United Nations imposed sanctions on Sudan in 1996, but enforcement has been sporadic (United Nations, 1996; Edith M. Lederer, April 13, 2001, U.S. says Sudan must end terrorist sanctuary before UN sanctions are lifted, accessed April 14, 2001, at URL http://www.sudan.net/news/posted/2078.html). Since November 1997, Sudan also has been subject to economic sanctions by the United States. The sanctions, which were codified in the Code of Federal Regulations title 31, part 538,

prohibited investment by U.S. businesses in Sudan. On February 14, 2000, the Canadian Government released the results of a 1999 investigation into allegations that Canadian oil company operations in Sudan contributed to the escalation of the 17-year-old civil war and to associated increased human rights abuse and slavery (Harker, 2000). On the basis of the report, the Canadian Government announced that it would continue its policy of dialogue with the Government of Sudan and would not impose sanctions on Talisman Energy Inc. (Talisman Energy Inc., 2000). On February 16, the U.S. Department of the Treasury announced that U.S. economic sanctions against Sudan had been extended to Greater Nile Petroleum Operating Co. (GNPOC), and to Sudapet Ltd. of Sudan, but not to the international corporate owners of GNPOC [China National Petroleum Corp. (CNPC) (40% equity interest); Petronas Carigali Overseas Shd. Bhd. of Malaysia (30%); and State Petroleum Corp., which was a subsidiary of Talisman Energy Inc. of Canada (25%)] (U.S. Department of the Treasury, 2000).

In 2000, publicly owned international oil companies publicized community development projects and humanitarian relief undertaken in Sudan as increasingly intense allegations of Government-abetted atrocities hit the newsstands, thus raising awareness of the longstanding civil war (1955-72 and 1983-present). Criticism was focused on the oil industry (Amnesty International, 2000, p. 2-16, 18-20; Christian Aid, 2000, p. 1-3, 6-11, 14-34; Sheppard and Manhas, 2000). Mineral development, especially oil revenues, had become an acknowledged factor in the civil war (Harker, 2000, p. 14).

Mineral commodity production was small. Sudan was relatively unexplored compared with other countries, and the civil war limited exploration and development. Much of the country's solid minerals activity was located northwest of Port Sudan in the Ariab-Abra'at area, at Hofrat En-Nahas along the Central African Republic border, in the Ingessana Hills along the Ethiopian frontier, and in the Red Sea Hills along Sudan's coast. Oil production was in southern Sudan.

For \$40 million, the Lafarge Group of France and Dal Group of Sudan acquired Atbara Cement Co. Ltd., which operated a 360,000-metric-ton-per-year-capacity cement plant at Atbara. The Lafarge-Dal joint venture proposed to invest an additional \$170 million to increase production capacity to 1.2 million metric tons per year (Indian Ocean Newsletter, 2000). The state-owned Nile Cement Co. operated a plant at Rabak.

Chromite was mined in the Ingessana Hills. At the end of 1999, Billiton Plc of the United Kingdom ended its copper exploration program in the Hofrat En-Nahas area.

In July, Cie. Française de Mines et Métaux, which was a subsidiary of Cie. Général des Matèrials Nucleaires, acquired 40% equity interest in the Ariab Mining Co. from Cie. Minière Or, which was a subsidiary of Bureau de Recherches Géologiques et Minières (BRGM). BRGM had retained partial

¹Where necessary, values have been converted from Sudanese Dinars to U.S. dollars at the rate of D256=US\$1.00 for 2000 and D160=US\$1.00 for 1999. The Sudanese Dinar (D) replaced the Sudanese Pound (S£) on March 1, 1999.

ownership interest of Ariab Mining in 1999 when the LaSource Compagnie Minière SAS broke up. Ariab Mining mined the Adassedakh, the Baderuk, and the Hadal Auatib deposits and was exploring for copper and gold near its mine at Ariab. Ariab Mining had initiated gold exploration in the Nubian Desert during 1999. Artisanal gold miners operated in the Fazugli and the Kapoeta areas. Several Chinese companies reportedly held interests in gold mining joint ventures in Sudan (Scott, 2000).

On blocks 1 and 2 north of Bentiu in the Muglad Basin, GNPOC continued to drill wells and to produce crude petroleum in El Harr, El Nar, El Toor, the Greater Heglig, the Toma South, and the Unity Fields. In 2000, crude oil production from GNPOC increased to about 185,000 barrels per day (bbl/d) from about 47,000 bbl/d in 1999 and 5,000 bbl/d in 1998. In October, OGP Technical Services (a subsidiary of Petronas) began planning a 2-year 50,000-bbl/d expansion of the GNPOC production with the development of two new oilfields, which included the Munga prospect (Iran Daily, October 19, 2000, Economic features—Petronas wins Sudan deal, accessed October 23, 2000, at URL http://www.iran-daily.com/3).

On block 3 northwest of Malakal in the Melut Basin, Gulf Petroleum (Sudan) Ltd. [a joint venture of Qatar Petroleum Co. (60%), Concorp International Ltd. of Sudan (20%), and Sudapet Ltd. (20%)] was producing about 5,000 bbl/d during the dry season (December-May) from the three-well Adar-Yale Field. In March, the joint venture of Melut Petroleum Co. Ltd. (46% equity interest), Gulf Petroleum (Sudan) (46%), and Sudapet (8%) was formed to explore the rest of Gulf Petroleum (Sudan)'s concession area in the Melut Basin. Melut Petroleum withdrew from the venture when incessant coverage of the Sudan civil war adversely affected the availability of funding for work in Sudan (Fosters Resources Ltd., 2001). The Government subsequent issued a new EPSA to a consortium of Gulf Petroleum (Sudan) (46% equity interest), CNPC (23%), Thani Co. of the United Arab Emirates (23%), and Sudapet (8%).

On block 5A, the partnership of International Petroleum Corp. Sudan Ltd. (40.4% equity interest in the partnership), which was an affiliate of Lundin Oil AB of Sweden; Petronas (28.5%); OMV (Sudan) Exploration GmbH of Austria (26.1%); and Sudapet (5%) built a 75-kilometer (km) all-weather road from the riverside base camp at Rubkona to the Thar Jath and the Jarayan well sites. Northeast of Muglad, CNPC was exploring Block 6, which contained the 2,000-bbl/d Abu Ghabra, the Sharaf, and the Tabaldi Fields. TotalFinaElf S.A. retained the rights to block 5 north of Juba; operations had been suspended in 1985 because of the civil war. In July, the Government opened a 50,000-bbl/d-capacity petroleum refinery about 70 km north of Khartoum. Other petroleum refining operations in Sudan included a 21,700-bbl/d-capacity facility at Port Sudan, a 10,000-bbl/d-capacity topping plant near El Obeid, and a 2,000-bbl/d-capacity topping plant at Abu Ghabra (Arab Petroleum Research Center, 2000, p. 423). With the output from the new refinery, Sudan produced sufficient petroleum products to meet domestic demand and exported surplus refined petroleum products.

In 2000, Sudan received \$10 million from the Organization of Petroleum Exporting Countries Fund for International Development to rehabilitate the diesel-fired electricity generating plant at Khashm el Girba and sections of the national electricity distribution network. The poor condition of local infrastructure continued to plague mineral operations. Roads were the primary means of transportation. In the south, many roads were passable only during the dry season. The 4,800-km railway and associated rolling stock were in poor condition, but the Government of Iran proposed to assist Sudan's Railway Co. with railcar maintenance, railway development, and traffic signals. The Government of Sudan began a study of extending its rail network into the Central African Republic, Chad, and Ethiopia. The 250,000-bbl/d-capacity pipeline from the Heglig and the Unity Fields to Marsa al Bashayir was a target for rebels and was bombed in September and November 1999 and January 2000. After each incident, the resultant pipeline damage was repaired within a couple of days.

The Government has partnered with international companies to develop the gold and petroleum sectors. Crude oil exports and production from the new oil refinery have freed funds previously dedicated to importing crude and refined petroleum. Applied to development or payment of international debt, the oil money could revive the national economy that has been hampered by the shortage of hard currency. Locally produced asphalt would permit the upgrading of the road network. Refined oil products could be used to produce electrical power. With the existing state of awareness of the civil war, diverting oil profits exclusively to the military sector and neglecting domestic development would not be tolerated by much of the international nongovernmental community.

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#### Other Source of Information

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TABLE 1 SUDAN: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/2/

## (Metric tons unless otherwise specified)

Commodity		1996	1997	1998	1999	2000
Cement, hydraulic		380,000	291,000	206,000 r/ 3/	267,000 r/ 3/	300,000
Chromite, mine output, gross weight 4/		12,000	30,500	20,000	10,000	10,000
Gold, mine output, Au content 5/	kilograms	4,500	4,554 r/ 3/	5,653 r/3/	6,000	6,000
Petroleum:						
Crude (including lease condensate)	thousand 42-gallon barrels	1,000	2,000	1,200	19,000 r/	69,000
Refinery products	do.	7,000	6,000 r/	6,000 r/	8,000 r/	15,000
Salt		50,000	50,000	45,000	50,000	50,000

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<sup>1/</sup> Includes data available through April 1, 2001.

<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); gypsum for cement manufacture (about 0.04 metric ton per metric ton of finished cement) and plaster; 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; and other construction materials (clays, sand and gravel, stone, et al. for local use, and marble for export).

<sup>3/</sup> Reported figure.

<sup>4/</sup> Presumed to be ores and concentrates with an estimated average grade of about 48% chromic oxide.

<sup>5/</sup> Does not include artisanal output.