

THE MINERAL INDUSTRY OF GUINEA

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In 2004, Guinea's mineral production consisted mainly of alumina, bauxite, cement, diamond, gold, and salt. Undeveloped mineral resources included graphite, iron, limestone, manganese, nickel, and uranium. The mining sector accounted for more than 80% of exports, 25% to 30% of Government revenues, and 17% to 20% of the gross domestic product (GDP) (Ministry of Mines and Geology, 2005a).

Real GDP was estimated to have increased by 2.7% compared with 1.2% in 2003 mostly owing to a modest increase in the construction, public works, and service sectors. According to the International Monetary Fund (2005, p. 5), Guinea's economic activities remained weak in 2004 and were adversely affected by cement shortages, electricity outages, instability in neighboring countries, and little investment by the private sector as a result of the uncertainty of the internal political environment. The country's GDP at purchasing power parity was estimated to be about \$17.8 billion in 2004 (International Monetary Fund, 2005¹).

Government Policies and Programs

The Centre de Promotion et de Développement Minière (CPDM), in cooperation with the World Bank and Co-opération Française, deals with mining investments (Wright, 2004). Guinea's Mining Code provides for five types of licenses, which include a reconnaissance license, a prospecting permit, an operating permit, a mining concession, and an artisanal operating permit. Reconnaissance licenses are issued by the Direction Nationale des Mines (DNM) upon recommendation of CPDM for a maximum term of 3 months and are renewable once for an additional 3 months. Application for a prospecting permit must be made to the Ministry of Mines and registered at the CPDM. The permit may be obtained for a term of 2 or 3 years and may be renewed twice for a maximum of 2 years for each renewal. With each renewal, the prospecting area is reduced by one-half. Application for an operating permit must be made to the Ministry of Mines; the permit is valid for a maximum of 10 years. The application must include an environmental impact study and a rehabilitation plan. An operating permit may be extended more than once for a maximum of 5 years for each renewal. Mining concessions are granted by Presidential decree upon recommendation of the Minister of Mines for a period of 25 years and may be renewed for an additional 10 years (Mining Promotion and Development Center, 2005).

¹References that include a section mark (§) are found in the Internet References Cited section.

Commodity Review

Metals

Bauxite and Alumina.—Bauxite was Guinea's major source of foreign currency. In 2004, Guinea continued to rank among the world's top five producers of bauxite. Guinea's bauxite-bearing regions were Lowland-Guinea, Upper-Guinea, and Mid-Guinea. Bauxite resources in these regions were estimated to be 5 billion metric tons (Gt), 2 Gt, and 500 million metric tons (Mt), respectively, and ranged between 44% and 53% Al_2O_3 and between 2% and 3% SiO_2 (Ministry of Mines and Geology, 2005a). The three companies that operated in the Lowland-Guinea region were Alumina Company of Guinea (ACG), Compagnie des Bauxites de Guinée (CBG), and Compagnie des Bauxites de Kindia (CBK).

ACG was a joint venture between Russian Aluminum Group (Rusal) (85%) and the Government (15%). The company mined bauxite from the Friguia deposits and refined the ore into alumina onsite. The alumina was transported by railway to the Conakry harbor where it was exported (Ministry of Mines and Geology, 2005a).

In early 2004, Rusal planned to conduct a feasibility study to expand the Friguia alumina refinery and increase production capacity to 1.4 million metric tons per year (Mt/yr) from its existing capacity of 700,000 metric tons per year (t/yr). The study was to be conducted by Hatch Associates of Canada and All-Russia Aluminium and Magnesium Institute (a subsidiary of Rusal). The estimated cost of the expansion was \$350 million. The engineering, procurement, and construction phases of the project were scheduled for early 2005 (Engineering and Mining Journal, 2004).

CBG was a joint venture between Halco Mining Inc. (51%) and the Government (49%). In 2004, Comalco Limited (a subsidiary of Rio Tinto plc) sold its 4% stake in Halco to the remaining shareholders. Following the sale, ownership in Halco was distributed between Alcan Inc. (45%), Alcoa Inc. (45%), and Dadco Group (10%). CBG produced between 11 and 14 Mt/yr of bauxite at an average grade of 53% Al_2O_3 and 2% SiO_2 . Halco shareholders bought bauxite from CBG for use in their own production processes (Industrial Minerals, 2004; Ministry of Mines and Geology, 2005a).

CBG's production came from three bauxite deposits at Bidikoum, Sangaredi, and Silidara. The resource for these deposits was estimated to be over 300 Mt. Historically, the ore grade at the Bidikoum deposit was 50% Al_2O_3 ; at Sangaredi, 56% to 58% Al_2O_3 ; and at Silidara, 52% Al_2O_3 . About 85% to 90% of the ore mined by CBG came from the Bidikoum and

Silidara deposits. The run-of-mine ore was stockpiled along the mine's rail sidings and consisted of material from different pits to provide a consistent blend. The ore was then transported to a treatment plant in Kamsar where it was crushed and dried (from an average 12.5% moisture to 6.7% moisture for shipping), then stockpiled, transported along the plant's 1.6 kilometer (km)-long jetty to ship loaders, and exported (Ministry of Mines and Geology, 2005a; Mining-technology.com, 2004§).

In May 2004, Alcan and Alcoa signed a memorandum of understanding to jointly build a new 1.5-Mt/yr alumina refinery in Kamsar. In November, the two companies and the Government signed a protocol of negotiation for the development of the refinery. A feasibility study for the alumina plant was underway during the year. The study's expected completion date was mid-2005. The Kamsar refinery was expected to begin production in 2008 (Alcan Inc., 2004; Industrial Minerals, 2004; Ministry of Mines and Geology, 2005a).

CBK was 100% owned by Rusal, which mined the Debele deposits. Annual output ranged between 1.4 and 2.0 Mt of ore at a grade of 45% to 46% Al_2O_3 and 2.9% SiO_2 . Bauxite was transported by railway to the Conakry harbor and exported to the Nikolaev refinery in Ukraine (Ministry of Mines and Geology, 2005a).

The bauxite potential at the Tougue and Dabola areas, which are located within the Upper-Guinea region, was estimated to be 2 Gt at a grade of 44.1% Al_2O_3 and 2.6% SiO_2 . The Société des Bauxites de Dabola-Tougué was interested in mining these areas as soon as the Transguinean Railway is constructed (Ministry of Mines and Geology, 2005a).

In October 2004, Global Alumina Products Corporation (GAPCO) signed an investment and concession agreement with the Government to build a 2.8-Mt/yr alumina refinery in Sangaredi. Construction work was scheduled to begin in mid-2005 and production of the first alumina was scheduled for 2008 at a cost of \$2 billion (Global Alumina Products Corporation, 2004; Ministry of Mines and Geology, 2005a).

Gold.—Gold occurred as veins and alluvial deposits and was mined on artisanal, small, and industrial scales. The country's main gold-bearing area was the Siguiiri basin, which is located within the Upper-Guinea region. Gold was also found in the Fitaba, N'Zerekore, and Sierra-Fore areas. More than 100 gold prospecting licenses were granted in Guinea between 1999 and 2003. Gold was produced by Société Ashanti de Guinée (SAG), Société Minière de Dinguiraye (SMD), Société d'Exploitation Minière d'Afrique de l'Ouest-Guinée (SEMAFO-Guinée), and small-scale and artisanal miners (Ministry of Mines and Geology, 2005c).

SAG, which was owned by AngloGold Ashanti Ltd. (85%) and the Government (15%), operated the Siguiiri gold mine. AngloGold Ashanti was created in April 2004, following the merger of AngloGold Limited and Ashanti Goldfields Limited. In 2004, production at the Siguiiri Mine fell to 2,582 kilograms (kg) from 7,863 kg in 2003. The company attributed the fall in production to the Government's embargo on gold sales and on imports of fuel during the second quarter of the year, and to a shortage of cement supplies, which resulted in a reduction of crushing and stacking operations (Ministry of Mines and

Geology, 2005c; AngloGold Ashanti, 2005§). The Government placed an embargo on the supply of diesel fuel to the Siguiiri gold mine and on exports of its gold bullion in May 2004, pending renegotiation of the terms of AngloGold Ashanti's contract (Africa Mining Intelligence, 2004). The Government lifted the embargo in August 2004 as negotiations were resumed (AngloGold Ashanti, 2004§). SAG planned to construct a new processing plant with a capacity to process 12 t/yr of gold. The Siguiiri Mine is located in the Prefecture of Siguiiri about 850 km northeast of Conakry. Gold was mined from primary gold deposits (Ministry of Mines and Geology, 2005c).

SMD, which was owned by Guinor Gold Corp. of Canada (85%) and the Government (15%), mined gold deposits at the Leró Mine. The Leró gold mine was located at the border between the Prefectures of Siguiiri and Dinguiraye. In 2004, gold production, which came from the Fayalal and Tambico deposits, fell to about 2,403 kg (reported as 77,245 troy ounces) from 2,884 kg in 2003 (Guinor Gold Corp., 2005§). Guinor was conducting a feasibility study at Leró to determine future drilling target areas. In June, RSG Global Pty Ltd. of Australia, which was the company in charge of the study, announced a new estimate of measured and indicated resources of 54 Mt at a grade of 1.6 grams per metric ton (g/t) gold, with measured resources comprising 25 Mt at a grade of 1.8 g/t gold (Mining Journal, 2004). SMD planned to build a new carbon-in-leach (CIL) processing plant to process sulfide ore at the Leró Mine; in November, however, the company announced that it had entered into a Heads of Agreement to purchase an existing CIL plant in Indonesia from a subsidiary of Rio Tinto. The overall cost of the purchase, which included a metallurgical plant, powerplant, accessories and spares, and dismantling, packaging and loading onto barges, will be \$15 million. A \$1 million deposit will be required when the definitive sale and purchase agreement is reached. The plant was expected to become available by the end of the first quarter of 2005. Once running, the average throughput was estimated to be nearly 6 Mt/yr of ore (Guinor Gold Corp., 2004).

SEMAFO-Guinée operated the Kiniero Mine, which is located near the town of Kouroussa about 650 km east of Conakry. The company, which was owned by Semafo Inc. of Canada (85%) and the Government (15%), began production at the Kiniero Mine in 2002. The mine produced about 1,277 kg (reported as 41,049 troy ounces) of gold in 2004. As of December 2004, measured and indicated resources at Kiniero were reported to be about 5.3 Mt at a grade of 3.22 g/t gold (Semafo Inc., 2005).

Artisanal production was sold to collectors or directly to the Central Bank of Guinea, which owned two buying counters in Conakry and Kankan (Ministry of Mines and Geology, 2005c).

Other companies that were either exploring for gold in the country or in the process of acquiring a participating interest in gold projects were Chester Mining Ltd. of Australia, and Canadian companies Mano River Resources Inc. and Pro-Veinor Resources. In September, Cassidy Gold Corp. announced that it had acquired a 75% interest in Société Minière Africaine S.A.R.L., which held the Tambiko and Siguiiri exploration permits (Cassidy Gold Corp., 2004). Chester Mining completed a soil sampling program for its Kosoko and Saranfara properties

and applied for a 1-year extension of its exploration permit for these properties (Chester Mining Ltd., 2004).

Iron Ore.—Guinea hosted the Mount Nimba and Simandou iron ore deposits in the southeastern part of the country. The iron content of these Banded Iron Formation deposits was estimated to be between 66% and 68%. Lateritic iron deposits occurred in Lowland-Guinea and included the Kaloum Peninsula deposit in Conakry and other deposits in Forecariah. Other iron ore occurrences were identified in Upper-Guinea, Mid-Guinea, and Forested-Guinea (Ministry of Mines and Geology, 2005d).

Mount Nimba is a 25-km-long mountain range in Forested-Guinea that borders Côte d'Ivoire and Liberia. The Mount Nimba iron ore deposit is subdivided into four ore bodies: Château, Grands Rochers, Pierre-Richaud, and Sempere. Resources at Mount Nimba were estimated to be more than 1 Gt of iron ore at a grade of 63% to 68% iron. A mining agreement for the exploitation of the Mount Nimba deposit was signed in April 2003, and a new mining company was created under the name of Société des Mines de Fer de Guinée. The company was owned by Euronimba (85%) [a consortium formed by BHP Billiton Plc of the United Kingdom (43.5%), Newmont Mining Corp. of the United States through Newmont-LaSource (43.5%), and the Areva/Cogema Group of France through its subsidiary Cominor (13%)], the Government (10%), and Mifergui-Nimba (5%). The envisioned mining rate at Mount Nimba was 20 Mt/yr of iron ore (Ministry of Mines and Geology, 2005d).

Simandou, which is a 115-km-long mountain range along the Beyla, Kerouane, and Macenta Prefectures, hosts the Pic de Fon iron ore deposit. Resources at Pic de Fon were estimated to be about 1.2 Gt of iron ore at a grade of about 65% to 68% iron. Rio Tinto considered mining the deposit at a rate of 25 Mt/yr at first and then at a rate of 40 Mt/yr. The feasibility of the project would depend upon the construction of the Transguinean Railway. A mining agreement between Rio Tinto and the Government was signed in November 2002 and ratified in February 2003. The concession was to be granted to SIMFER SA Guinea, which was a subsidiary of Rio Tinto (Ministry of Mines and Geology, 2005d).

Industrial Minerals

Diamond.—Guinea's main diamond deposits were located in Kerouane, Kissidougou, and Macenta along the Baoule, Diani, and Milo Rivers. Other diamond occurrences were identified in Forecariah and Kindia. The country's diamond resources were estimated to be between 25 and 30 million carats. Diamond was mined from alluvial, eluvial, and kimberlite deposits (Ministry of Mines and Geology, 2005b). Guinea was a participant in the Kimberley Process (Wright, 2004).

In 2004, national diamond production rose to 739,891 carats from 666,000 carats in 2003. About 700,000 carats was produced by artisanal and small-scale miners and the remaining was produced by the Aredor-First City Mining Company (Aredor-FCMC), which was a joint venture between Trivalence Mining Corporation of Canada (85%) and the Government (15%). Artisanal and small-scale mining was concentrated mainly in the Banankoro area in Kerouane, on lands reserved

by the Government in the Aredor-FCMC SA concession, and in Kindia. Aredor-FCMC mined along the Boule River and its tributaries and produced on average between 12,000 and 38,000 carats per year (Ministry of Mines and Geology, 2005b).

Diamond was exported through the National Bureau of Expertise (BNE), which evaluated the diamonds and issued Certificates of Origin in compliance with the Kimberley Process. BNE collected a 3% tax on diamond exports (Ministry of Mines and Geology, 2005b).

Rio Tinto Mining and Exploration Limited, a subsidiary of Rio Tinto, and a subsidiary of the South African De Beers Company were some of the companies that held diamond exploitation and/or exploration permits in Guinea in 2004 (Ministry of Mines and Geology, 2005b).

Mineral Fuels

Petroleum.—In 2004, Guinea did not produce or refine petroleum and was dependent upon imports for its petroleum requirements.

Infrastructure

Guinea had three active railway lines, which connected the Debele, Fira, and Sangaredi Mines to the Conakry harbor. A fourth line that connected Kankan to Conakry was out of use during 2004 (Ministry of Mines and Geology, 2005a). Rio Tinto and Euronimba planned to finance a bankable feasibility study for the Transguinean Railway, which will run from Lola, which is located near Mount Nimba to Matakang, which is located southeast of Conakry. The project included the construction of a deep-water harbor in Matakan. The envisioned railway will have a capacity to transport about 60 Mt/yr of ore and was estimated to cost \$2.5 billion (Ministry of Mines and Geology, 2005d).

Outlook

The International Monetary Fund (2005, p. 8) foresees Guinea's economy reaching a real GDP growth of 3% in 2005, primarily as a result of an economic rebound in the mining sector, and the picking up of the trade and services sectors. The rebound in the mining sector was attributed to a continued increase in private investments.

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TABLE 1
GUINEA: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Commodity	2000	2001	2002	2003	2004 ^e	
GUINEA ²						
Alumina:						
Production:						
Hydrate	-- ^r	-- ^r	44 ^r	8 ^r	9	
Calcined	571 ^r	644 ^r	680 ^r	730 ^r	770	
Shipments, calcined	571 ^r	644 ^r	724 ^r	738 ^r	779	
Bauxite:						
Mine production:						
Wet basis ³	17,950	17,267	17,480	17,044	17,000	
Dry basis ^{e,4}	15,700 ⁵	15,100	15,300	15,000	15,000	
Calcined	100 ^e	75	--	--	--	
Shipments (dry basis):						
Metallurgical	14,213 ^r	13,842 ^r	14,087 ^r	13,939 ^r	14,000	
Calcined	100 ^e	77 ^r	--	--	--	
Cement	300	315	360	360 ^e	360	
Diamond ^{6,7}	thousand carats	327 ^r	364	491	666	740 ⁵
Gold ⁷	kilograms	15,788 ^r	16,205 ^r	16,815 ^r	16,622 ^r	10,700
Salt ^e		15	15	15	15	15

^eEstimated; estimated data are rounded to no more than three significant digits. ^rRevised. -- Zero.

¹Table includes data available through August 29, 2005.

²In addition to the commodities listed, Guinea produced modest quantities of crude construction materials (clays, sand and gravel, and stone), but information is inadequate to make reliable estimates of output levels.

³Metallurgical ore plus calcinable ore estimated to be 13% water.

⁴Data are for wet-basis ore estimated to be 13% water reduced to dry basis estimated to be 3% water.

⁵Reported figure.

⁶Production is approximately 70% to 80% gem quality.

⁷Figures include artisanal production.

TABLE 2
GUINEA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity
Alumina		Alumina Company of Guinea (Russian Aluminum Group, 85%, and Government, 15%)	Friguia plant	700,000.
Bauxite		Compagnie des Bauxites de Guinée [Government, 49%, and Halco Mining Inc., 51% (Halco Mining was a consortium formed by Alcoa Inc., 45%; Alcan Inc., 45%; and Dadco Group, 10%)]	Kamsar and Sangaredi	14,000,000.
Do.		Compagnie des Bauxites de Kindia (Russian Aluminum Group 100%)	Kindia	2,000,000.
Do.		Alumina Company of Guinea (Russian Aluminum Group, 85%, and Government, 15%)	Friguia Mine	2,300,000.
Cement		Ciments de Guinee (Holcim Ltd., 51%, and Government, 44%)	Conakry plant	360,000.
Diamond	carats	Aredor-First City Mining Company (Government, 15%, and Trivalence Mining Corporation, 85%)	Aredor Mine	38,000.
Do.	carats	Artisanal miners	Mainly in Banankoro	700,000.
Gold		Société Ashanti de Guinée (AngloGold-Ashanti, 85%, and Government, 15%)	Siguiri Mine	9,000,000 ore.
Do.	kilograms	do.	do.	9,300 gold.
Do.		Société Minière de Dinguiraye (Guinor, 85%, and Government, 15%)	Lero-Karta Mine	1,100,000 ore.
Do.	kilograms	do.	do.	3,500 gold.
Do.		Societe d'Exploitation Minière d'Afrique de l'Ouest Guinée (Semafo Inc., 85%, and Government, 15%)	Kiniero Mine	400,000 ore.
Do.	kilograms	do.	do.	1,700 gold.