

THE MINERAL INDUSTRY OF

GUINEA

By David Izon¹

In 1994, Guinea remained second to Australia in the production of bauxite. The country possessed one-third of the world's known bauxite deposits, as well as high-grade iron ore deposits, diamonds, gold, manganese, and other gemstones and precious metals. Only bauxite was produced commercially in 1994. However, artisanal production of diamonds and gold continued and the Central Bank maintained its program of buying back gold at 50% of market price. The minerals sector accounted for about 25% of the gross domestic product (GDP) of about \$3.4 billion² in 1994. Sales of three main commodities, bauxite, diamond, and gold, made up more than 98% of all mineral sales. The revenue from mineral exports amounted to about \$548 million. Alumina and bauxite totaled more than 91% of all mineral exports, despite the slump in the mineral sector due to low world market prices for aluminum. In general, mineral exports accounted for more than 90% of the country's total exports and about 35% of Government revenues.

The MIFERGUI-Nimba iron ore mining project was put on an indefinite hold because of a lack of financing, inadequate infrastructure, and political instability in Liberia. Because Guinea's iron ore deposits are on the Liberian border, the project was affected by the civil insurgencies in Liberia. The resolution of the Liberian conflict would determine when the development of the Nimba project would begin. Guinea's iron ore ranked potentially among the most important worldwide because of its high iron content. The country's 1987 investment code offered liberal taxation and regulatory privileges to companies or individuals investing in strategic sectors, particularly mining. However, ongoing revisions to the tax code could increase income and import taxes that may affect medium-to-large foreign ventures and reduce the margin of benefits for investors.

Government Policies and Programs

Mining in Guinea was governed by code No. 076/PRG of March 1986, as amended by orders Nos. 10236 to 10245, issued on October 22, 1988. The current investment code was adopted in code No. 001/PRG/87 of January 1987. Ongoing revisions of the existing mining code and investment code are intended to liberalize both laws to provide more opportunities for prospective investors, including majority private ownership. Because the mining sector's base law of 1984 remained in effect, the terms of all mining concessions are being negotiated on a case-by-case

basis.

Work started on the Government's joint-venture agreement with the Government of Iran to undertake a bauxite mining project in the Dabola-Touge region in northern Guinea, 60 kilometers (km) east of Labe and 350 km northeast of Conakry. Also, Australia-based Golden Shamrock Mining Ltd., Colorado-based Cyprus-Amax Minerals Co., and Kenor Mining Co. of Norway signed agreements to explore for gold, respectively, in the Siguiri, Mandiana, and Dinguiraye regions.

Previously adopted policies under the Government's structural adjustment program continued to be implemented. Other fiscal policies being implemented for the 1994-95 fiscal year were intended to diversify the mineral industry and reduce the Government's dependence on revenue and export earnings from bauxite mining. However, closure in 1992 of Guinea's only gold mine at Siguiri set back diversification efforts.

Environmental Issues

The Ministry of Natural Resources, Energy and Environment administers the mining sector and grants licenses and permits for exploration, exploitation, and marketing of minerals produced in Guinea. Under this ministry is the Department of Environment, which makes policy and regulates environmental issues, particularly with regard to mining. Procedures for minerals production and processing require an environmental impact statement to be attached to an application before approval for a mining license is given. The environmental study on the Nimba project is continuing to search for ways to avoid pollution of the Cavalli River, which flows into Côte d'Ivoire.

Production

In 1994, mineral production was mainly from five mines, excluding quarries; four bauxite mines at Bidikoum, Fria, Kindia, and Sangarédi, and one diamond mine at Gbenko. Development of one of Guinea's potentially important minerals, the high-grade iron ore deposits at the Nimba Mountains, was hindered by lack of adequate infrastructure, financing, and regional stability. The country's only gold mine, "Koron Mine," which was closed in 1992, remained shut down, but two companies have signed agreements to explore and develop existing and new sites. (*See table 1.*)

Trade

The mineral sector dominated exports because nearly all major minerals produced were sold in overseas markets. Guinea remained dependent on mining exports for government revenue and foreign exchange earnings. Major mineral commodities traded in 1994 were bauxite, alumina, and diamonds. Revenue from sales of diamonds and gold did not include the value of smuggled artisanal production. The total value of mineral exports for 1994, mainly bauxite, alumina, and diamonds, was about \$550 million.² Low world prices for bauxite and alumina, combined with shortfalls in projected revenues, left Guinea with a trade deficit of about \$340 million.

In 1994, Guinea's principal trading partners were Australia, Cameroon, Canada, the former Soviet Union (FSU), France, Germany, Nigeria, Norway, Portugal, the United Kingdom and the United States. Mineral exports to the United States were mainly bauxite. Guinea's imports from the United States included industrial machines, vehicles, construction materials, fertilizers, petroleum products, and pharmaceuticals.

Structure of the Mineral Industry

The mineral industry remained dominated by the production of bauxite by three companies, one of which was entirely state-owned. Artisanal production of diamond and gold was widespread and official estimates were not available.

Guinea's labor force was estimated to be about 2.6 million workers, an estimated 20% of whom were in the industrial sector. Guinea's formal mining industry employed about 6,550 workers in 1994. About 78% of these were in the bauxite and alumina sector. Government policy encourages the training of Guinean staff to replace expatriates. The latter account for about 6% of the mining labor force. (*See table 2.*)

Commodity Review

Metals

Bauxite and Alumina.—The first phase of the Guinea-Iran Dabola project, expected to produce 600,000 metric tons per year (mt/a), could depend on the rehabilitation of the old Niger rail line from Dabola to Conakry. Because the rail line was not constructed for the transportation of minerals, additional investment may be required to replace the line with a rail system capable of accommodating up to 1 million metric tons per year (Mmt/a). Also, Office des Bauxites de Kindia, the bauxite mining company formerly operated by the Government of Guinea and the FSU, was being restructured with the assistance of the World Bank. The new enterprise, named Societe de Bauxite de Kindia (SBK), would promote private investment under the new arrangement.

In 1994, Compagnie des Bauxites de Guinea (CBG)

maintained its role as Guinea's largest producer of bauxite at more than 12 Mmt/a wet basis, with an alumina (Al₂O₃) content of 57.7%. CBG continued with the upgrading and extension of facilities that included the startup of Bidikoum deposit and the renovation of Kamsar plant. The Bidikoum Mine was opened to enable blending ore with the production from Sangarédi Mine to prolong the life of the high-grade ore found in Sangarédi. The African Development Bank provided 70% of the funding for the BidiKoum project at a cost of \$170 million. CBG employed 2,517 people, of which 17 were expatriates. Bauxite operations at SBK employed 1,841 workers, including 67 expatriates. The Government adopted measures that could more than double the production capacity at Friguia to 1.3 Mmt/a, after world market prices and demand for aluminum improved. A management improvement program under the new measures included releasing Friguia from obligations to provide free water, electricity, social services, and medicine to its staff by yearend 1996.

Gold.—Gold occurs as hydrothermal quartz veins in Birimian rocks at several locations in Guinea. Artisanal operators have mined lateritized gold placers for many years in the Kankan, Kouroussa, Mandiana, and Siguiiri regions, known as "la zone du Boure." Reserves in the mineralized zones in the northeastern part of the country were estimated to range from 200 to 1,000 mt.

After the pullout of Union Miniere of Belgium in 1992, the Government of Guinea authorized an Australia affiliate of a U.S. company, Golden Shamrock Mining Ltd., to explore and undertake mining of the Koron Mine. The transaction involved Shamrock's purchase of Union Miniere's 50% share, as well as all but 15% of the Government's shares. The Government's role in the venture would be limited to regulatory and fiscal issues. Artisanal miners continued to operate as exploration activities in the Siguiiri prospect progressed. According to the Mining Journal of September 16, 1994, exploration results were so encouraging that it was expected to add significantly to the 16,578 kilograms (533,000 troy ounces) inferred resources announced in August 1994.

In other developments, Cyprus-Amax Minerals Co. of Colorado signed an agreement with the Government to explore and develop gold properties on a 3,000-square-kilometer (km²) area in the Mandiana region. Cyprus-Amax would own 85% of the interest and the Government of Guinea, 15%. The agreement called for Cyprus-Amax to explore Guinea's western region extensively for new gold deposits.

A joint-venture company, Societe Miniere de Dinguiraye (SMD), was formed to operate at Lero in the Dinguiraye concession, covering an area of about 1,500 km². Production was expected to begin in early 1995 by the open pit method, with 1.4 million metric tons (Mmt) of minable ore, at a grade of 3.7 grams per metric ton (g/mt) in the upper veins, according to the Government. This saprolitic deposit would not require any blasting. According to the Government of

Guinea, SMD was held 15% held by the Government, 42.5% by Kenor of Norway, and 42.5% by Mine Or Co. of France. A second mine was expected to be opened at the Fayalala deposit 8 km from Lero, with minable ore reserves of 3.5 Mmt at a grade of 1.9 g/mt.

Industrial Minerals

Diamonds continued to be found in kimberlite pipes and in the alluvial gravels that extend from these kimberlites. Six of these pipes, near Banankoro, were believed to be the source of Guinea's high-quality, unusually large gemstones. These alluvial deposits were in the Baoule and Bimboko River Valleys. Placer mining took place in the Baoule, Milo, and Diani River flood plains. This area contained about two-thirds of the country's known placer reserves and accounted for 80% of the official production of diamonds being mined. The diamonds were of 93% gem quality, and sold at an average price of about US\$300 per carat. Operations at the Aredor³ diamond mine in Gbenko were suspended in October 1993 because of the continued presence of artisanal miners squatting and prospecting on the company's concession. The situation reportedly was beyond control after soldiers sent to protect the mine also joined in prospecting. The site was, however, being maintained and kept in good condition.

Reserves

According to Direction Generale de Geologie of Guinea, estimates of total bauxite resources varied but were on the order of 20 billion mt, and proven reserves were about 18 billion mt. Reserves remaining at Sangarédi were about 175 Mmt grading between 50% to 60% alumina and 0.5% to 2% silicon (SiO₂). Reserves at Bidikoum were about 20 Mmt grading about 55% alumina. There were large additional deposits of lower-grade ore in the area. Reserves at the Debelé deposit were about 28 Mmt grading 45% to 46% alumina. Friguia's reserves were reported to be in excess of 200 Mmt grading about 40% alumina. Official reserve estimates for diamond and gold were not available but were believed to be significant.

Iron ore reserves at the Nimba Mountains were estimated to be about 350 Mmt grading 66.5% iron. A number of other lower-grade iron ore resources occurred elsewhere in Guinea, but they were of little or no commercial value.

Infrastructure

Mining railroads totaled 239 km of standard-gauge 1.435-meter (m) line and 806 km of 1-m line. A 135-km standard-gauge 1.435-m line linked the Sangarédi Mine with the Port of Kamsar, and a 104-km standard-gauge line linked the Kindia Mine with Conakry. A 145-km, 1-m line linked the Fria Mine with Conakry. In addition to the mine railroads, 661 km of 1-m-gauge line connected Conakry with Kankan;

this line was in very poor condition, but was undergoing rehabilitation with French assistance. The Dabola-Conakry rail line also was to be upgraded.

Guinea had two main ports: Kamsar and Conakry. Kamsar served the Sangarédi Mine, handling only bauxite shipments. Conakry served the Fria and Kindia Mines and also was the country's main general cargo port. The country had 1,280 km of navigable waterways, which could also provide hydroelectric power for future demand. The European Investment Bank's (EIB) \$10 million water supply project in Conakry was in progress. The project involved the extension and modernization of existing facilities, including the construction of a second treatment plant and two reservoirs.

The \$150 million Energie Electrique de Guinee (Enelgui) program to build a dam at Garafiri, begun in 1992, had not received adequate financial backing. With a planned output of 260 gigawatt hours, the project was expected to reduce power supply problems in the country.

Outlook

Bauxite and alumina was expected to continue dominating Guinea's economy. The addition of the Bidikoum Mine should help maintain high-quality exports of bauxite. Friguia's production capacity of alumina was expected to increase as renovations and expansions are completed. Projects requiring major hydroelectric power, such as the proposed aluminum smelter, could become technically feasible as the power generation capacity is increased under current plans.

There was reason to believe that Guinea's formal diamond and gold industries would survive if new investments and adequate exploration programs were undertaken to secure continued production at most recent or higher levels. The addition of the Mandiana, Lero, and Fayalala gold deposits should provide extra revenue for the Government. The MIFERGUI-Nimba iron ore project remained dependent upon a solution to Liberia's civil war.

The deterioration of the country's infrastructure during the past 15 years tended to diminish the country's comparative advantage in attracting foreign private capital to invest and develop the mineral industry.

¹Text prepared in June 1995.

²Where necessary, values have been converted from Guinean francs (GF) to U.S. dollars at the rate of GF810=US\$1.00, which was the exchange rate for Dec. 1994.

³"Aredor" is an acronym for Association pour la Recherche l'Exploitation du Diamants et de l'Or. Aredor Holdings Ltd. is a consortium of Australian companies Bridge Oil Ltd., 79.2%; and Bankers Trust Australia (U.K.) Ltd, 3.52%; Industrial Diamond Co. (Holdings) Ltd. (United Kingdom), 6%; and the International Finance Corp., 11.28%.

Major Source of Information

Ministry of Natural Resources and the Environment
P.O. Box 295 Conakry, Republic of Guinea

TABLE 1
GUINEA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Thousand metric tons unless otherwise specified)

| Commodity 3/ | 1990 | 1991 | 1992 | 1993 | 1994 |
|-------------------------------|-----------------|-----------|--------|--------|--------|
| Alumina: | | | | | |
| Production: | | | | | |
| Hydrate | 642 | 640 | 601 | 642 | 650 |
| Calcined | 631 | 610 | 561 | 656 | 660 |
| Shipments, calcined | 631 | 610 | 553 | 656 | 660 |
| Bauxite: | | | | | |
| Mine production: | | | | | |
| Wet basis 4/ | 17,500 | 17,200 | 14,900 | 16,300 | 16,300 |
| Dry basis 5/ | 15,800 r/ | 15,500 r/ | 13,800 | 14,100 | 14,100 |
| Calcined 6/ | 140 | 132 | 96 | 90 | 90 |
| Shipments (dry basis): | | | | | |
| Metallurgical | 14,000 | 13,500 | 12,300 | 13,600 | 13,600 |
| Calcined | 133 | 92 | 95 | 90 | 90 |
| Diamond: 7/ | | | | | |
| Gem e/ | thousand carats | 119 | 91 | 90 | 90 |
| Industrial e/ | do. | 8 | 6 | 5 | 5 |
| Total | do. | 127 | 97 | 95 | 100 |
| Gold 8/ | kilograms | 6,340 | 4,450 | 2,110 | 500 |

e/ Estimated. r/ Revised.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

2/ In addition to the commodities listed, modest quantities of crude construction materials (clays, sand and gravel, and stone) presumably are produced, but output is not reported quantitatively, and available information is inadequate to make reliable estimates of output levels. Table includes data available through May 12, 1995.

3/ All figures were reported by Bureau de Stratégie et de Marketing Minier of Guinea.

4/ Metallurgical plus calcinable ore estimated at 13% water.

5/ Data are for wet-basis ore estimated at 13% water, reduced to dry basis estimated at 3% water.

6/ Data are for Compagnie des Bauxites de Guinée, the sole producer of calcined bauxite.

7/ Figures do not include undocumented artisanal production believed smuggled out of the country.

8/ Figures include undocumented artisanal production. Aurifere de Guinea (AuG) is the only reporting gold mining company, reporting the following, in kilograms: 1990--1,750; 1991--1,450; 1992--1,110; 1993--500; and 1994--500.

TABLE 2
GUINEA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Million metric tons unless otherwise specified)

| Commodity | Major operating companies and major equity owners | Location of main facilities | Annual capacity |
|---------------------|---|--|------------------------------|
| Bauxite and alumina | Compagnie des Bauxites de Guinee (Halco Mining Inc., 51%; Government, 49%) | Sangarédi Mine, about 242 kilometers north of Conakry. Drying and shiploading facilities are at Kamsar, 160 kilometers northwest 160 kilometers northwest of Conakry | 12.2 bauxite. |
| Do. | Société d'Economie Mixte Friguia (FRIALCO Holding Co., 51%; Government, 49%) | Fria Mine and Kimbo alumina plant are at Fria, 75 kilometers north of Conakry | 2.5 bauxite, 0.7 alumina. |
| Do. | Offices des Bauxites de Kindia (Government, 100%) | Kindia Mine (Debele deposit) at Kindia, about 110 kilometers northeast of Conakry | 3 bauxite. |
| Diamond | carats | Société Mixte Aredor de Guinée S.A.1/ (Government, 100%) | 200,000. |
| Gold 2/ | kilograms | Golden Shamrock Mining Ltd. | 2,000. |
| Do. | do. | Societe Mineire Dinguiraye (Kenor of Norway, 42.5%; Mine Or of France, 42.5%; Government, 15%) | Lero placer mine 2,000. |

1/ "Aredor" is an acronym for Association pour la Recherche l'Exploitation du Diamants et de l'Or. Aredor Holdings Ltd. was a consortium of Australian companies Bridge Oil Ltd., 79.2% and Bankers Trust Australia (U.K.) Ltd., 3.52%; Industrial Diamond Co. (Holdings) Ltd. (United Kingdom), 6%; and the International Finance Corp. 11.28%. However, since Bridge Oil pulled out, Aredor is Government operated.

2/ The Koron Mine was closed in Aug. 1992, and new contracts to reopen the mine was signed in 1993 with Golden Shamrock Mining Ltd.; also, a second contract was signed for the new mine to be developed in the Mandiana region by Cyprus-Amox of the United States.