

# GUINEA

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Following several years of an improving period of straightforward and market - economy based development an efficient system is in place for making sure that mining investment takes place, and an increasing number of major companies are showing interest. However, problems exist with internal politics and with the relationships with neighbouring countries. Although a Sierra Leone border meeting was conducted between Presidents Conteh of Guinea and Kabbah of Sierra Leone in Summer 2001, which appears to resolve problems across that border, it is essential for the future development of the region that problems of border conflicts with Liberia are also resolved.

## **Promotion of the Mining Sector**

The CPDM (Centre de Promotion et de Développement Minières), deals with all aspects of investment in the mining sector. In co-operation with the World Bank and the Co-operation Française, a promotional programme includes a database (SIGM) of mining investment related information on line to potential investors. Improvements to the mining code, with assistance from the World Bank, include reduction of free carried interest to 15% and limiting it to gold and diamond projects only.

A technical programme conducted by the Ministère des Mines included:

- Evaluation and inventory of mineral resources, maps of the whole country at 1:500,000 scale, and compilation of geological and mineral occurrence data; German Geological Survey (BGR), 1998.
- New geological mapping of the Pre-Cambrian at 1:200,000 scale, and an airborne geophysical survey over 112,000 km<sup>2</sup> (BRGM, Aerodat), 1999.

Sets for each one degree sheet comprising maps of geology, geophysics, mineral distribution and potential, plus an explanatory note. Summary maps at 1:500,000 scale.

## **Geology and Mineral Potential**

Granite-schist belt terrain of Pre-Cambrian age is found in the east of Guinea. Archaean rocks to the south have been thrust northwards over a Birimian basin to the north. The Archaean is often associated with economic deposits of a wide range of minerals. Sedimentary rocks of Pre-Cambrian to Recent age cover the centre and west of the country. Swarms of Mesozoic dolerite and kimberlite dykes, and some basic intrusions along the coastline, cut the Pre-Cambrian rocks. Mesozoic and Cainozoic sediments on the continental shelf overlap the shoreline.

## **Mining**

In Guinea, iron ore, diamonds and gold are known, and weathering has led to economic bauxite deposits. Three bauxite mines are in production. The Birimian rocks also are highly prospective for gold. Two mines are in production and a third under construction. The Mesozoic and Cainozoic basin rocks along the coastline are prospective for hydrocarbons.

Gold from Guinea was found in the treasures of Carthage 2,800 years ago and the region gave its name to the first British gold coin. On a pilgrimage to Mecca in the fourteenth century, the king of the Mali empire, Kankou Moussa Keita, distributed 8 t of gold. In 1591, under the control of the Moroccan Empire, 1.5 t of gold were known to have been produced in the Manden area.

In 1999, 102 mining and exploration sector companies had registered seven mining

concessions, 28 exploitation and 153 exploration permits. Last year, 16 new permits were granted.

### Aluminium

In terms of the economy of the country, bauxite is the most important commodity produced. Already one of the world's major producers, development of an increased production of bauxite, together with the development of more in-country aluminium processing, is the intention over the next decade.

In 2000, approximately 17.84 Mt of bauxite was produced of which total, Cie des Bauxites de Guinée (CBG) produced 14.41 Mt. CBG is a 50% partnership between the government and Halco (Alcoa/ Alcan/ VAW/ Pechiney/ Reynolds/ Comalco). Grades are dropping as high-grade (62%) ore is depleted. Alcoa is implementing technical audits to increase production and efficiency. By January 2000, monthly production had increased to 1.445 Mt.

Reynolds Metals is in managerial control of FriGuia (2.3 Mt) with its own alumina refinery. An efficiency and upgrading programme will increase annual refinery throughput from 0.64 Mt to 1.4 Mt. Last year, 550,000 t were produced and 700,000 t is planned for 2001.

Société des Bauxites de Kindia (1.13 Mt) is in government ownership, and 2.25 Mt production is planned for 2001.

Three development projects are being planned, two designed to increase in-country processing:

The project GAPCO (Guinea Aluminium Products Co.) has three objectives: the construction of a hydro-electric barrage to produce 750 MW; an aluminium foundry (240,000 t/y of product) at Sangaredi to process ore from CBG; and the doubling of alumina capacity at Friguia refinery to around 1 Mt/y.

An agreement of intent has been signed. Participation is likely to be Enron (Encom) 20%; Marubeni 25%; Mitsubishi 20%, SFI 10%; Investisseurs aluminiers 10% and the Guinea Government 15%. The cost is estimated at US\$2,500 million.

In addition, construction of a hydro-electric barrage of 50 MW is planned on the Cogon River to supply CBG and the township of Boké. Completion is intended during the next five years, and the project will replace existing generators. Also, discussions are being held with the United Arab Emirates to build a 1.3 Mt/y capacity aluminium smelter based on the development of the Dian Dian bauxite deposits north of Boké.

### Gold

At Siguiri, Société Ashanti Guinée (SAG) is mining saprolitic and laterite deposits in nine pits along a NNW trend. Rocks are derived from quartz vein stockworks and mineralised breccias. Production of 220,211 oz in 2000 was at a cash cost of US\$180/oz. The forecast for 2001 is 300,000 oz. Proved and possible reserves are 2.7 Moz at 1.37 g/t Au.

Société Minière de Dinguiraye (SMD), 85% owned by Kenor AS, is mining gold at Lero. The mine is a heap-leach operation treating saprolite ore derived from mineralised sandstones, breccias and conglomerates. Last year, production was 100,000 oz against a prediction of 103,000 oz. This is a large increase on 1999 as a result of increased tonnage from a second oxidised quartz stockwork deposit at Fayala (31 Mt at 1.3 g/t Au) coming on stream. Resources at Lero and the adjacent Karta deposit amount to 27 Mt averaging 1.69 g/t Au.

### Diamonds

Alluvial and colluvial deposits above weathered kimberlite dykes and pipes are being mined by Trivalence Mining at Aredor, by Quatro C in the Banankoro region of Kerouane, and by Hymex in the southeast of the country.

Hymex, in the Macenta district, is mining in the Diani valley where 700,000 ct were produced between 1993 and 1996. Reserves of gravel are estimated as sufficient for eleven years at 7.7 Mm<sup>3</sup>/y. Problems with the commissioning of a 160 m<sup>3</sup>/h plant in 1998 caused a serious interruption to production. Production in 2000 was 1,558 ct with a sale price average of US\$166/ct. Production this year is forecast at 12,000 ct.

The 1,112 km<sup>2</sup> Aredor concession has produced many of the high-value gem quality stones produced in Guinea. Ten years production to 1994 when the mine closed was 1.3 Mct. Trivalence took over the operation in 1996 and has renovated and replaced most of the existing equipment to increase its alluvial production. Production in 2000 was 36,893 ct with a sale price average of US\$381/ct. Predictions for 2001 give production of 73,000 ct.

Quatro.C, a company run by a Guinean entrepreneur, is mining at Somassania at Kerouane. It reports production of 14,400 ct in 2000, up from 492 ct in 1998 when a value of US\$298/ct was reported.

### Exploration

Exploration for diamonds, gold, bauxite, iron ore, nickel and oil is in progress.

### Diamonds

Trivalence is exploring its Aredor concession to investigate hard-rock kimberlite potential. A 3,200 m drilling programme has been completed on the A23, 4.9 ha kimberlite and bulk sampling is planned. A joint venture agreement has been signed with Rio Tinto with the provision to earn up to 58% of any hard rock kimberlite deposit found on the property.

Rio Tinto also has an arrangement to explore and develop kimberlite potential in Hymex's 1,032 km<sup>2</sup> concession area, and has taken exploration licences in the newly discovered Kindia diamond fields.

De Beers' subsidiary Debsam has completed a regional reconnaissance programme over the

whole southeastern diamondfield and has shown interest in developing some of the deposits there. One pipe and 20 dykes, plus other known targets, are being drilled in joint venture with existing licence holders

### Gold

The operators at Siguiri and Lero are having significant success in extending their resources. At Siguiri, step out and along strike drilling is adding 250,000 oz/y with a new deposit at Tubani. At Lero, drilling added 1.24 Moz in 1999. A regional programme in progress includes the area around Banora, a quartz vein and stockwork mine which operated in the colonial period;

Following many years of agreement between the governments of Guinea and Morocco to assist in the development of Guinea's mineral and energy resources, the Moroccan company ONA through its subsidiary Managem commenced exploration in the Siguiri area. Subsequently, the company has signed agreements with Semafo, a Canadian company, in which it now holds a majority interest and intends to develop the Jean and Gobélé vein deposits at Kouroussa. Semafo has completed a feasibility study and construction is now going ahead.

Resources are estimated at 1.97 Mt averaging 6.43 g/t Au. A 60,000 oz/y mine using a 500 t/d plant is proposed and production is on target to start in 2003, with a production cost of US\$157/oz. A total of 80,000 oz were sold forward at US\$295/oz on May 24, 2001, as part of a programme to sell forward a total of 160,000 oz by 2006. A third mineralised structure is under evaluation.

Only a limited number of other gold exploration companies are active in Guinea. Golden Limbo Rock Resources has completed a follow-up trenching and pitting programme in its Missamana and Gueliban permits where thousands of artisanal miners were active in the mid-1980s. A programme of reverse circulation (RC) drilling, airborne geophysics and geochemistry has already been completed.

Cambior has announced results from a 1,482 m drilling programme on the Seogui property owned by Japan Minerals near Mandiana, 75 km southeast of Siguiri. Grades are very variable with a best intersection exceeding 40 m averaging 3.7 g/t Au.

### Iron Ore

Rio Tinto is evaluating and drilling deposits in the Simandou Range. Seven diamond drill holes and a second phase of RC and diamond drilling has demonstrated thick sections of hematite (open to depth in many holes) grading 65% Fe. More than 1,000 Mt is estimated possible of supporting a 40 Mt/y mine

EuroNimba, comprising La Source and Billiton (recently merged with BHP), is investigating the possibility of mining the Mount Nimba Iron ores. Following a feasibility study, MIFERGUI (involving both Guinea and Liberia), was moving towards development at the start of the Liberian civil crisis in 1990. A 1,550 ha area is now allocated for mining and the legal framework of the operation established. A 20 Mt/y mine costing US\$300 million is envisaged.

The Guinean Government wishes to move quickly towards production but, without the Liberians, transport for both projects is envisaged to be by a very long Trans-Guinean railroad.

### Nickel

Rio Tinto and Semafo are exploring the Kakoulima Hill nickel deposits. Rio Tinto is drilling anomalies arising from an airborne geophysical programme.

### Petroleum

Exploration was commenced by Shell in 1967 which left the country after the nationalisation of its petrol outlets in 1970. From 1974 until 1979, Buttes Gas Oil formed a joint venture with the government (SOGUIP). It completed 6,350 line kilometres of seismic traversing, took 5,000 km<sup>2</sup> of ground and drilled one 3,353 m well. Union Texas Petroleum and Superior Oil (1979-1985)

completed 6,591 km of geophysical lines and planned two wells.

With assistance from the World Bank, a promotional campaign was commenced in 1999. Some 16,340 line kilometres of data exist for the shallow water part of the continental shelf. Western Geophysical was contracted in December, 1999 to complete 5,200 line kilometres of two-dimensional seismic surveying in the deeper part of the basin. The data are available to interested parties wishing to bid for around 33 blocks, each of around 5000 km<sup>2</sup> of first, the deeper shelf and second, the shallower water.

### Transport and Logistics

Development of bauxite and iron ore depends on suitable transport. Re-habilitation of the Buchanan to Nimba railroad in Liberia would provide a link for the iron ores. However, bauxite deposits in the centre of the country require the Trans-Guinea railway linking Conakry, through Kindia, Dabola and Kankan to the Simandou and Nimba areas. The government is determined to pursue this option but in transport terms the Trans-Guinea railway could appear considerably more feasible if connected into a link south to Buchanan and Monrovia with a traffic flow in both directions. A link north-eastwards to Bamako, the Malian railroads and the Niger River, could also be an option to create a true West African railroad.

A pre-feasibility study by the Japanese firm Nippon Koei (with contributions by SOGRAMCAN, SNC-Lavalin and De Consult), for the 800 km Trans-Guinean railway suggests a cost of US\$3,000 million for the whole route with a new port at the island of Matakang in the prefecture of Forecariah. Rio Tinto and EuroNimba are intending to finance a study of other options, such as a route via Sierra Leone, in an attempt to reduce the cost substantially.

A paved road is nearing completion from Conakry to Kankan. The ferry across the Niger, near Kouroussa, has been replaced by a bridge.