

REPUBLIC OF GUINEA

*Leslie Wright, Vice President Exploration, Mano River Resources Inc.
and Morcire Sylla, Directeur Général, Centre de Promotion et de Développement Minier
(CPDM), Ministère des Ressources Naturelles et de L'Énergie, République de Guinée.*

President Lansana Conté was re-elected two years ago, and in parliamentary elections in 2002 the ruling party won a sizeable majority. Although the presidential term has recently been extended from five to seven years, the country now appears politically stable. Problems still exist with relationships with neighbouring countries, most particularly Liberia, where Guinea has consistently accused the Liberian Government of supporting rebels hostile to the central government. In turn, Guinea is accused by Liberia of supporting rebels fighting to remove President Taylor. Communication between the three Mano River countries (Guinea, Liberia and Sierra Leone) was re-established early in 2002, culminating in the holding of a successful summit in Rabat, Morocco, at which Presidents Conté, Kabbah and Taylor signed a joint communiqué pledging to respect each other's borders and to work towards the revitalisation of the Mano River Union.

Following a decade that has seen an improvement in the economy, investment in Guinea has recently been affected by the generally negative media coverage of the region as a war zone.

Mining Sector Promotion

An efficient system is in place for encouraging mining investment and a number of major companies are now involved.

The CPDM (Centre de Promotion et de Développement Miniers), deals with all aspects of investment in the mining sector. In co-operation with the World Bank and Coopération Française, the organisation has introduced a promotional programme that includes a database (SIGM) of mining investment-related information. Improvements have been made to the mining code, with

assistance from the World Bank, including a reduction in the free-carried interest to 15%, and limiting it to gold and diamond projects only.

The technical programme conducted by the Ministère des Mines included:

- 1 Evaluation and inventory of mineral resources, maps of the whole country at 1:500,000 scale and compilation of geological and mineral occurrence data.
- 2 New geological mapping of the Pre-Cambrian at 1:200,000 scale and an airborne geophysical survey over 112,000 km². Sets for each one degree sheet (comprising maps of geology, geophysics, and mineral distribution, plus an explanatory note). Summary maps at 1:500,000 scale.
- 3 A second programme by Coopération Française aimed at institution building in the CPDM, improvement of the database, establishment of a CPDM website and including a significant overseas training component for local technical staff. This programme commenced in July 2001. The programme is conducted by BRGM and includes satellite interpretation and geological mapping of Dinguiraye, Tougué, Dabola, Kissidougou and north of Kerouane. The project is valued at €1.52 million, and is financed by the French Government through FSP (Fonds de Solidarité Prioritaire; which replaced the FAC).

Geology and Mineral Potential

Granite-schist belt terrain of Proterozoic age is found in the east of Guinea. Archaean rocks to the south have been thrust northwards over a Birimian basin to the north. Sedimentary rocks of Proterozoic to Recent age cover the centre and west of the country. Swarms of Mesozoic

dolerite and kimberlite dykes, and some basic intrusions along the coast, cut the Proterozoic rocks. Mesozoic and Cainozoic sediments on the continental shelf overlap the shoreline.

The Archaean is often associated with economic deposits of a wide range of minerals. In Guinea, iron ore, diamonds and gold are known and weathering has created economic bauxite deposits. The Birimian rocks also are highly prospective for gold. The Mesozoic and Cenozoic basin rocks along the coastline are prospective for hydrocarbons.

Guinea is best known, however, for its historic association with gold. Gold from Guinea was found in the treasures of Carthage 814 B.C. 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 eight tons of gold. In 1591, under the control of the Moroccan Empire, 1,500 kg of gold were known to have been produced in the Manden area.

Mining and Exploration

The mining sector in Guinea contributes around 25% of the country's income, with bauxite production by far the most important contributor. The last few years have been characterised by an ongoing programme to modernise and re-structure the aluminium industry to make it efficient and profitable, and to increase production. Three bauxite mines are in production. At the same time, efforts to diversify Guinea's bulk commodity mining base into iron ore are continuing, with Rio Tinto and BHP-Billiton active in their respective permits at Simandou and Mount Nimba.

For gold, the highlight of the year was the opening by the Moroccan/ Canadian company, Semafo, of the Kineiro mine in the prefecture of Kouroussa in April 2002 with planned production of 60,000 oz/y. This brings to three the number of producing gold mines in Guinea, further re-establishing Guinea as a gold producer. Both of the existing gold mines at Siguiri and Dinguiraye are in the process of increasing their production.

In diamonds, Debsam, (a De Beers company), has diversified into other areas of the country since completing an evaluation in Haute Guinea. Aredor First City Mining, in partnership with Rio Tinto, continue to explore for kimberlite in their concession at Banankoro, at the same time as mining the alluvial deposits of the concession.

Guinea is a participant in the Kimberley Process of diamond certification and inaugurated its own certification scheme on the June 19, 2001.

In 1999, 102 mining and exploration sector companies registered seven mining concessions, 28 exploitation and 153 exploration permits. (16 permits were granted in 2000.) A review of the present position is in progress by CPDM.

Aluminium

In 2001 production was divided between three operators:

- **Companie des Bauxites de Guinée (CBG)** (12.3 Mt), is a 50:50 partnership between the government and Halco (Alcoa/Alcan/VAW/Pechiney/Reynolds/Comalco). Grades have been dropping as high grade (62%) ore is depleted. Alcoa have been implementing technical audits to increase production and efficiency.
- **Reynolds Metals** is in managerial control of Friguia (2.3 Mt in 2000) with its own alumina refinery. An efficiency and upgrading programme is intended to increase refinery throughput from 0.6 Mt to 1.4 Mt, (0.7 Mt was produced in 2001).
- **Société des Bauxites de Kindia** (1.6 Mt) is in government ownership.

Guinea Aluminium Products Co (GAPCO) has three projects under consideration, First, construction of a hydro-electric barrage on the Konkouré River at Souapiti-Kaletta to produce 750 MW. Second, the construction of an aluminium foundry producing 2.6 Mt/y at Sangaredi to process ore from CBG. Throughput will be 8 Mt of bauxite and the

cost US\$2.2 billion. Third, the doubling of the capacity of the refinery at Friguia to 1 Mt/y.

A letter of intent has been signed, with participation likely to include: Marubeni, Mitsubishi, SFI, Investisseurs Aluminiers and the Guinea Government. A delegation including Mitsubishi and BHP-Billiton visited Guinea in May 2002, with a view to the latter assessing its potential involvement in the GAPCO projects. The total cost is estimated at US\$2.5 billion.

A project is in discussion with the Arab Emirates to build a 2.6 Mt/y aluminium foundry using the Dian Dian bauxite deposits north of Boké. The cost of this investment is estimated at US\$2.8 billion.

Gold

At Siguiri, Société Ashanti Guinée (SAG) is mining saprolitic and laterite deposits derived from vein stockworks and mineralised breccias in nine pits along a NNW trend. Production of 220,211 oz in 2000 was at a cash cost of US\$180/oz. Production in 2001 was expected to be 300,000 oz. Proven and probable reserves are 2.7 Moz (based on an average grade of 1.37 g/t Au).

Société Minière de Dinguiraye (SMD), is mining gold at Lero, 85% owned by Kenor AS. The mine is a heap leach operation of saprolite ore derived from mineralised sandstones, breccias and conglomerates. Production in 2000 was 100,000 oz against a prediction of 103,000 oz. The resource at Lero and the adjacent Karta deposit is estimated at 27 Mt averaging 1.69 g/t Au.

Following many years of discussions between the governments of Guinea and Morocco regarding assisting in the development of Guinea's mineral and energy resources, the Moroccan company ONA (through Managem) commenced exploration in the Siguiri area. Subsequently, the company signed agreements with Semafo, a Canadian company, in which it now holds a majority interest. The partners have developed the Jean

and Gobélé vein deposits, in the prefecture of Kouroussa, to form the Kiniero gold mine with an annual production of 60,000 oz/y and a five-year mine life. Mining will be open-pit for the first three years with a production of 296,000 t of ore followed by an underground mine for 1.8 years at an annual production of 160,000 t. It is hoped to extend the reserve base from 1.14 Mt. The feasibility study defined resources of 1.97 Mt at 6.43 g/t Au. Initial investment was US\$12.4 million with an expected production cost of US\$157/oz. Some 80,000 oz of gold were sold forward at US\$295/oz on May 24, 2001, part of a programme to sell forward a total of 160,000 oz by 2006. A third mineralised structure is under evaluation.

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.

Diamonds

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

Hymex is mining in the Diani valley in the Macenta district where 700,000 ct were produced from 1993-6. Reserves of gravel are estimated as sufficient for 11 years at 7.7 Mm³/y. Production in 2000 was 15,580 ct with a sale price average of US\$166/ct. Hymex has now taken over the re-processing of the tailings from the Aredor plant.

The 1,112 km² Aredor concession has produced many of the better 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 in Kerouane. It reported production of 14,400 ct in 2000 up from 492 ct in 1998 when a value of US\$298/ct was reported.

Trivalence is exploring its Aredor concession, investigating 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 which can earn up to 58% of any kimberlite deposit found on the property.

Rio Tinto also has an arrangement to explore and develop hard rock potential on Hymex's 1,032 km² concession, 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 diamond field and has shown interest in developing some of these deposits. One pipe and 20 dykes, plus other known targets in joint venture with pre-existing licence holders, are being drilled. Exploration is also continuing in a number of other areas of the country.

Iron Ore

Rio Tinto signed a letter of intent in 1997 to undertake evaluation and drilling of known deposits in the Simandou Range. Seven diamond drill holes, plus a second phase of reverse circulation and diamond drilling, has demonstrated thick sections of hematite (open to depth in many holes) grading 65% Fe. A resource of over 1,000 Mt has been estimated which is capable of supporting a 40 Mt/y mine.

EuroNimba, (La Source and Billiton - the latter now merged with BHP), has investigated the possibility of mining the Mount Nimba iron ores. A 1,550 ha area was allocated for mining and a 20 Mt/y mine, costing US\$300, envisaged. The Guinean Government wishes to move quickly towards production but, without the Liberian railroad, transport would be via a very long Trans-Guinean railroad terminating in a port near Conakry.

Nickel

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

Petroleum

Shell withdrew from Guinea after nationalisation of its petrol outlets in 1970. From 1974 to 1979, Buttes Gas Oil formed a joint venture with the government (SOGUIP), which completed 6,350 line kilometres of seismic traversing, took 5,000 km² 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.

In the late 1990s with assistance from the World Bank, a promotional campaign was conducted based on 16,340 line kilometres of data for the shallow water part of the continental shelf. In December 1999, Western Geophysical was contracted to complete 5,200 line kilometres of two-dimensional seismic surveying in the deeper parts of the basin. These data are now available to interested parties wishing to bid for around 33 blocks (each of around 5,000 km²).

Transport and Logistics

Development of bulk commodities such as 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 railroad linking Conakry, through

Kindia, Dabola and Kankan, to the Simandou and Nimba areas. The government is determined to pursue this option but the Trans-Guinean railway would be 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 railroad suggest a cost of US\$3 billion for the whole route with a new port at the island of Matakang in the prefecture of Forecariah. Rio Tinto and EuroNimba intend to finance a study of other options, such as a route via Sierra Leone, in an attempt to reduce the capital investment.