

THE MINERAL INDUSTRY OF

MALI

By Philip M. Mobbs

Gold was the most economically significant mineral commodity produced in Mali during 1996. The country had a wide variety of other mineral deposits, but few have been developed because of a lack of infrastructure and local demand (United Nations, 1987). Gold accounted for more than 95% of the estimated total value of mineral commodities produced in Mali and about 18% of the country's total exports of goods of more than \$400 million.¹

Mali's geology is dominated by Precambrian rocks in the southwestern and central parts of the country and Paleozoic to Cenozoic rocks over most of the remainder. The Precambrian rocks host the mineral deposits that are of the greatest economic importance, particularly those in the Birimian Series greenstone belts near Kéniéba, Bougouni, and Sikasso. As elsewhere in west Africa, the greenstone belts host gold deposits, commonly within shear zones and quartz veins. Extensive gold exploration continued during the year, as did small-scale (artisanal) mining of gold and diamond. The Government estimated artisanal output of gold to be 2.2 metric tons per year (t/yr) (Direction Nationale de la Géologie et des Mines, 1996). (See table 1.)

Mining was overseen by the Direction Nationale de Géologie et des Mines, which is part of the Ministère des Mines, de l'Énergie et de l'Hydraulique. The European Development Fund granted a \$16.8 million Sysmin loan to the Ministry to upgrade the availability of existing geologic and mining information². Proposed for the 4.5-year project to attract mineral investment were an aeromagnetic survey, the assembly of a geophysical data bank, and production of a series of 1:200,000-scale geologic maps.

The mining code included Decree No. 96-214/PM-RM of August 16, 1996, Ordonnance No. 91-065/P-CTSP of September 19, 1991, Decree No. 91-277/PM-RM of September 1991, and Decree No. 91-278/PM-RM of September 1991. Petroleum exploration and exploitation were regulated by Decree No. 30 of May 23, 1969, and by Decree No. 21, April 20, 1970. The Government had the right to 20% equity in all new mining ventures, of which 10% was a free share and the remainder a buy-in option. After 5 years of production, net profits were taxed at the rate of 35%. There was an ad valorem tax of 3% and a depletion allowance of as much as 27.5% (Ministère des Mines, de l'Énergie et de l'Hydraulique, 1995).

¹Where necessary, values have been converted from Communauté Financière Africaine francs (CFAf) to U.S. dollars at the 1996 yearend rate CFAf 525=US\$1.00.

²Values were converted from European currency units (ECU) to U.S. dollars at the rate of ECU 0.918=US\$1.00.

The Malian gold rush charged ahead during 1996 despite an early drill core sample salting scandal. During January, Timbuktu Gold Corp. of Canada, formerly known as Choice Software Systems, acquired the Sitakili gold property. Drill results indicating values of up to 200 grams of gold per ton of ore announced in mid-April resulted in a spectacular runup of the company's stock price. Subsequent investigation by the Alberta Stock Exchange determined that there was "compelling evidence of deliberate sample enrichment" (Mining Journal, 1996; Northern Miner, 1996).

Four development permits were outstanding. La Société d'Exploitation des Mines d'Or de Sadiola, S.A. (Semos), began gold production at Sadiola Hill, about 80 kilometers (km) southwest of Kayes in western Mali, on December 20. Semos is a consortium of Anmercusa Mining (West Africa) Ltd. (38%), a subsidiary of Anglo American Corp. of South Africa; AGEM Ltd. of Barbados (38%), a subsidiary of International African Mining Gold Corp. of Canada; the Government of Mali (18%); and the International Finance Corp., a member of the World Bank Group (6%). Mine and plant construction entailed transport of more than 40,000 metric tons (t) of material along the railroad from Dakar, Senegal, and by road from Kayes.

Semos designed the Sadiola Hill Mine as a 12-year open-pit operation. The first processing line was projected to be at full 2-million-metric-ton-per-year (Mt/yr) capacity by February 1997. By May 1997, the second processing line was also expected to be processing 2 Mt/yr. Semos had projected an annual production of 12 t/yr of gold, significantly increasing Mali's annual gold output, with about 14 kilograms (kg) being produced in 1996 (IAMGOLD, 1997; Northern Miner, 1997). The company planned to import 190,000 barrels of diesel fuel per year to feed the plant's 12-generator [15-megawatt (MW)] powerplant. Semos anticipated a local workforce of 250, augmented by 50 expatriates. The mining contractor, Moolman Brothers of South Africa, was expected to employ about 120 people.

The Société des Mines d'Or de Syama, S.A. (Somisy), operated the gold mine at Syama, 75 km southwest of Sikasso. During October, Randgold Resources of Jersey, Channel Islands, a subsidiary of Randgold & Exploration Co. of South Africa, acquired BHP Minerals Mali, a subsidiary of the Broken Hill Proprietary Co. of Australia (BHP), for about \$83 million. Included in the transaction were BHP's 65% interest in Somisy and 90% interest in the Morila and the Yanfolila exploration permits. BHP also divested its 20% option in the Société Minière de Loulo (Somilo) to Randgold. Somilo, a joint venture with the Government (41%) and LaSource of France (39%), had

originally been formed in 1988 to develop the Loulo concession.

Somisy's new ownership will be Randgold Minerals Mali Inc. (65%), the Malian Government (20%), and the International Finance Corp. (15%). BHP had been confronted with a less-than-expected rate of return on its investment, labor unrest at the facility, and metallurgical problems as the mine transitioned to processing sulfide ore. Randgold reported that it had produced 1,292 kg of gold during its management tenure of the 4,386 kg produced at Syama during the year (Fleming Martin Securities Ltd., 1997; Randgold Resources, 1997).

On the basis of a study of the Kalana underground gold mine, the joint venture of Ashanti Goldfields Co. Ltd. of Ghana and Johannesburg Consolidated Investment Co. Ltd. of South Africa reportedly decided not to redevelop the mine (Nelson Gold Corp. Ltd., 1997).

A number of companies were active on exploration permits in the west along the frontier with Senegal. The area encompasses the Kéniéba gold district and the exploitation permits at Loulo and Sadiola. Afko International Inc., a subsidiary of Afko Korea Inc., undertook a feasibility study on its permit. Azco Mining Inc. of the United States and West African Gold and Exploration Ltd. of the British Virgin Islands, a joint venture of Eagle River International Ltd. of Vanuatu and Lion Mining Finance Ltd. of the United Kingdom, organized the Sanou Mining Corp. during 1996. Sanou held a 100% working interest in the Médinandi and the Dandoko concessions, which had been acquired from the Russian consortium, Guefest.

Emerging Africa Gold Inc. of Canada was evaluating the Kolomba-Mancouke, the Koulo, and the Narena permits. Etlin Ltd. of Australia drilled its Yatela gold permit, north of Sadiola. International Tournigan Corp. of Canada was exploring the Diangounte West property. Nevsun Resources Ltd. of Canada was drilling on the Tabakoto East concession. North of Tabakoto, Oliver Gold Corp. of Canada was funding the feasibility study of the Segala concession to earn 50% interest in the property from Consolidated Mining Corp. (West Africa) (CMCWA) of Mali. Trillion Resources Ltd. of Canada acquired 51% of CMCWA with 29% interest being retained by Consolidated Mining Corp. of South Africa and 20%, by the Malian managing director.

Oxford Resources Inc. of Canada was evaluating the Sélou, the Dialafara-Rhama, and the Kéniéba group exploration permits. Pan African Resources Corp. of Canada (PARC) carried out a reverse circulation drilling program on the four-permit Dioulafoundou Property. PARC was also evaluating the Melgué and the Ouaiaga permits. Pangea Goldfields Inc. of Canada sampled the Fodie property, north of Sadiola.

Randgold was reconnoitering the Kérékoto property. Raymor Resources Ltd. of Canada acquired 85% interest in the Yeremounde gold property from COMIFA, S.A., of Mali. Ressources Robex Inc. of Canada acquired a 51% interest in the Diangounte and the Kata concessions from N'Gary Transport. Ressources Robex and Alpine Exploration Corp. of Canada were evaluating the Baroya concession with SOMEX S.A.R.L. of Mali. Reunion Mining plc of the United Kingdom was exploring SONAREM's optioned Sanoukou exploration permit. Sadiola Exploration Ltd. of the British Virgin Islands (SADEX)

was a 50-50 joint venture of Anmercosa and AGEM. SADEX drilled the Dinnguilou and the Farabakouta prospects and was evaluating the Alamoutala concession in the Sadiola I permit area, adjacent to the Sadiola Hill Mine.

Companies with exploration permits for the Kangaba, the Kalana, and the Syama regions south of Bamako included Alagona Trading, Anmercosa, and Barrick Gold Corp. Mink Mineral Resources Inc. of Canada was evaluating its Niaouleni gold concession. Oxford was studying its permit area in the Kangaba region. Pacific Galleon Mining Corp. of Canada acquired interest in the Finkolo concession and an option on the Niena concession, north of the Syama Mine. Pangea Goldfields was evaluating its Foulaboula property. Sahelian Goldfields Inc. of Canada, formerly McNickel Inc., assembled the Kourémalé-Salémalé property from six nonrenewable local prospecting authorizations. Sodinaf S.A. of Mali was evaluating its Kodieran prospect. Young Poong Mining and Construction of Korea completed its initial reconnaissance program on the Gouenso gold project.

Diamonds were recovered as byproduct by artisanal gold miners. However, the Mali Diamond Exploration B.V. joint venture of Ashton West Africa Pty. Ltd. of Australia (51% interest) and Mink Mineral Resources (49%) proposed the establishment of a large-scale diamond operation. Ashton was sampling the Kéniéba-area diamond prospect for the venture.

Mali's transportation infrastructure was underdeveloped and has proven to be a deterrent to mineral exploration and development. The highway network totaled about 15,700 km, mostly in the south. The 1,286-km railroad connecting Bamako, Mali with Dakar included a 642-km segment through Mali. The railroad and the major roads to Côte d'Ivoire were used to import mineral-related products, particularly fuels, as well as equipment and supplies. Mali's electrical grid was inadequate to service mineral development. The gold rush and subsequent anticipated development activity will strain Mali's electrical power deliverability. The Government was seeking funding to rehabilitate the 44-MW Selingué Dam and to develop the Manantali hydroelectric generating station on the Senegal River.

Development of Mali's mineral resources was hindered by the country's general lack of infrastructure and local markets. The end of the 4-year Tuareg war should open northern and eastern Mali to mineral exploration. Gold will likely continue to dominate the country's mineral economy with current exploration efforts likely to lead to development of additional gold deposits by the turn of the century. Annual gold output is forecast to increase to almost 18 t in 1997 and to exceed 20 t by 1998.

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Major Sources of Information

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TABLE 1
MALI: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/		1992	1993	1994	1995	1996
Cement, hydraulic		20,000	20,000	15,000 r/	13,000 r/	15,000
Gold, mine output, gold content 3/	kilograms	5,700	5,500	6,200 r/	7,800	8,400
Gypsum		700	700	500 r/	450 r/	500
Phosphate		2,000	2,000	1,039	3,000	3,000
Salt		5,000	5,000	5,000	5,000	5,000
Silver 4/	kilograms	200	190	200 r/	250 r/	270

1/ Includes data available through Oct. 1997.

2/ In addition to the commodities listed, Mali produced clays, stone, and sand and gravel for local construction purposes in addition to diamond and tin, but information is inadequate to make reliable estimates of output levels.

3/ Includes estimate of artisanal production.

4/ Estimated silver content of doré bullion.