

THE MINERAL INDUSTRY OF

MALI

By Philip M. Mobbs

Gold was the most economically significant mineral commodity produced in Mali during 1998. Gold production from the Sadiola Hill Mine, the Syama Mine, and artisanal production reached an estimated 25 metric tons. Mali was tied for third with Zimbabwe on the list of African gold producers, after South Africa and Ghana. Despite 1998 being a difficult year for mining companies to raise capital, gold exploration continued during the year in the Birimian Series greenstone belts in the southern and southwestern parts of the country.

The gross domestic product (GDP) of landlocked Mali was \$2.5 billion in 1997, the latest year for which data are available. The agriculture sector contributed nearly 50% to the GDP. Gold accounted for about 36% of the country's 1997 exports of \$562 million.

Mining was overseen by the Direction Nationale de la Géologie et des Mines, which is part of the Ministère des Mines, de l'Énergie et de l'Hydraulique. 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. The Government had the right to a 20% equity in all new mining ventures, of which 10% was a free share and the remainder, a buy-in option. Net profits were taxed at the rate of 35% after a 5-year exemption period. The ad valorem tax was 3%, and the depletion allowance was as high as 27.5%. Petroleum exploration and exploitation were regulated by Decree No. 30 of May 23, 1969, and by Decree No. 21 of April 20, 1970.

The Société d'Exploitation des Mines d'Or de Sadiola, S.A. (Semos), operated the open pit Sadiola Hill Mine, about 80 kilometers (km) southwest of Kayes in western Mali. Semos was a consortium of Anmercosa Mining (West Africa) Ltd. (38%), a subsidiary of AngloGold Ltd. of South Africa (formerly part 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. (IFC) (6%), a member of the World Bank Group. In 1998, 10.3 million metric tons (Mt) of material were mined and 4.9 Mt of oxide ore were milled. Mill operations again exceeded the plant's design capacity of 4 million metric tons per year (Mt/yr). The mine produced 15,742 kilograms (kg) of gold, reported as 506,113 troy ounces (Northern Miner, 1999).

The Malian gold rush continued during 1998; however, a number of companies reduced or terminated their exploration efforts and spent as much or more effort searching for funding or joint-venture partners. Companies active on gold exploration permits along the western border with Senegal in

the area encompassing the Kéniéba gold district and the exploitation permits at Loulo and Sadiola included Afko Corp. Mali, a subsidiary of Afko Korea Inc., on a Kéniéba area property and African Goldfields Corp., a subsidiary of African Selection Mining Corp. of Canada, on the Kofi and the Metedia Est concessions. Exploration on the Djlimagara property continued as AngloGold (42.5%) joined the venture of Barrick Gold Corp. of Canada (42.5%) and the Government (15%). Emerging Africa Gold (EAG) Inc. of Canada explored the Mankouke West, the Kourou, and the Siribaya permits. The joint venture of Emerging African Gold (75%) and Geo-L of Russia (25%) held the Koulo permit. Golden Eagle Mining Ltd. was earning a percentage of African Selection Mining's interest in the Farina, the Gori, the Kanbele Est, the Kofi, the Metedia Est, the Metedia Sud, the Netekoto, and the Satifara concessions.

International Tournigan Corp. of Canada was soliciting for partners to fund further exploration on its Malian properties, including the Kolomba and the Mogoyafara properties held in joint venture with Société Nationale de Recherches et d'Exploitation des Ressources Minières de Mali and the Diangouste West property. MaliCan of Mali acquired the Dag Dag permit from Echo Bay Mines Ltd. of Canada. Marchmont Gold Corp. of Canada discontinued exploration of the Sitakili permit. The prefeasibility study for the Tabakoto concession was completed for Nevsun Resources Ltd. of Canada and its operating subsidiaries Nevsun Resources (Mali) Ltd. of Barbados and Nevsun Mali Ltd. of the British Virgin Islands. Project cost was estimated to be \$74 million (Nevsun Resources Ltd., 1999, p. 14). Nevsun, in joint venture with Le Groupement D'Intérêt Economique des Orpailleurs de Dioulafoundoung, was working the Dioulafoundoung concession. Nevsun restricted its exploration activity on the Kakadian concession and was earning a 75% interest in the Satifara concession from African Selection Mining. Nevsun's proposed purchase of the Dar Salam and the Segala concessions from Oliver Gold Corp. of Canada and Consolidated Mining Corp. (West Africa) S.A. of Mali (CMCWA), a subsidiary venture of Trillion Resources Ltd. of Canada (51%) and Consolidated Mining Corp. of South Africa (29%), was not realized.

The joint venture of North Ltd. of Australia and Randgold Resources Ltd. of the United Kingdom, a subsidiary of Randgold & Exploration Co. Ltd. of South Africa, was exploring the Yanifolila permit. Pan African Resources Corp. of Canada, a subsidiary of Golden Star Resources Ltd. of Canada, relinquished the Fougala and the Melgue properties. Doing business as Dialafara Exploration S.A., Randgold

Resources (Mali) Ltd., a subsidiary of Randgold Resources, and Leo Shield Exploration NL of Australia drilled the Dialafara permit. Leo Shield subsequently withdrew from the venture. Leo Shield also relinquished its interest in the Dialafara-Khama, the Karouma, and the Kouroufing concessions. Randgold secured an option to earn a 60% interest in the Médinandi and Dandoko gold properties from Western African Gold and Exploration Co. S.A., a subsidiary of Sanou Mining Corp., which would retain a 20% interest in the properties. Azco Mining Inc. of the United States, West African Gold & Exploration Ltd. of the British Virgin Islands, and Eagle River International Ltd. controlled Sanou. The Government also held 20% interest in the prospects.

Also working in the Kéniéba region was Raymor Resources Ltd. of Canada, earning 85% interest in the Yeremounde gold property from Compagnie de la Falame S.A. (Comifa) of Mali. A Comifa and Raymor joint venture was examining several of the Comifa exploration permits. The joint venture of Ressources Robex Inc. of Canada (85%) and N'Gary Transport of Mali (15%) drilled the Diangounté and the Kata concessions. Ressources Robex (25%) continued exploration of the Baroya concession for its joint-venture partners, Shiega Resources Corp. of Canada (65%), and SOMEX S.A.R.L. of Mali (10%). Robex was negotiating to acquire Shiega's interest in the property at yearend. The Société Minière de Loulo S.A., a joint venture of Randgold (51%), Mine Or, S.A., of France (29%), and the Government (20%) continued exploration on the Loulo permit. Randgold postponed the feasibility study of the proposed 9-year heap-leaching project to develop the Loulo prospect's measured, indicated, and inferred gold resources of 30.6 Mt grading 3.5 grams per ton (g/t) gold with a cutoff grade of 1.5 g/t. The postponement was because Randgold shifted its interest to the Morilla concession at midyear (Randgold Resources Ltd., [undated], Loulo Project, accessed June 2, 1999, at URL <http://www.geocities.com/~polarbear47/loulo.htm>).

Sadiola Exploration Ltd. of the British Virgin Islands (SADEX), a joint venture of AngloGold (50%) and Iamgold Corp. of Canada (50%), attributed a resource of 2 Mt of oxide ore grading 2.5 g/t gold with a 1.0 g/t cutoff grade to the Alamoutala deposit, about 15 km north of Sadiola. SADEX explored the Kourketo West deposit; completed the acquisition of the Yatela concession from Etlin Ltd. of Australia, 25 km north of the Sadiola Mine; and began a feasibility study of the Niamboulama deposit on Yatela in 1998.

The Société des Mines d'Or de Syama S.A. (Somisy), operated the open pit gold mine at Syama, 75 km southwest of Sikasso in southern Mali. Somisy was owned by Randgold Minerals (Mali) Inc. (75%), the Government of Mali (20%), and the IFC (5%). To increase the plant capacity, Somisy completed a \$63 million upgrade of the facility, including the installation of a new crusher, a new flotation circuit, a pre-owned ball mill, and a second-hand semiautogenous mill. In 1998, 14.1 Mt of material was mined, and 1.3 Mt of sulfide ore was milled. The mine produced 4,486 kg of gold in 1998. A \$11 million, 1.6 Mt/yr heap-leaching project to treat stockpiled low-grade ore was under construction at Syama. Gold resources at Syama were reported as 61.55 Mt of ore grading

3.38 g/t gold (Mining Magazine, 1999).

Companies evaluating gold exploration permits in the Kalana, the Kangaba, and the Syama regions in southern Mali included the joint venture of AngloGold, Barrick Gold, and the Government exploring the Finkalo and the Misseni properties; Carlin Resources Corp. of Canada, which relinquished its option on the Alagona Trading S.A.R.L. permit in 1998; and Mink International Resources Corp. of Canada. The venture of Nelson Gold Corp. Ltd. of Canada (70%), the Government (20%), and Ashanti Goldfields Co. Ltd. of Ghana (10%), was negotiating to reopen the former Kalana underground gold mine. Nelson Gold revised its 1997 feasibility study in January 1998 to account for the drop in the price of gold during 1997.

Oxford Resources Inc. of Canada proposed to expand its exploration activity in Mali and supported its local partners applications for several additional gold prospecting permits. Pangea Goldfields Inc. of Canada terminated its exploration of the Fodié and the Foulaboula prospects and was interested in divesting its interest in the properties. Prospector International Resources Inc. of Canada (formerly Pacific Galleon Mining Corp.) relinquished its concession in Mali.

In 1998, Prospec Mining Inc. of the United States acquired, mapped, and sampled the Samalofila gold property. Randgold completed its prefeasibility study of the Morila permit. Development of the prospect's resources of 33 Mt of ore grading 4.22 g/t gold was estimated to cost \$80 million, and a full feasibility study was begun at midyear (Mining Magazine, 1999). Randgold acquired the option to earn 65% interest in the Sélou property of Oxford. Sahelian Goldfields Inc. of Canada evaluated the Kourémalé-Salémalé property.

North of the former Kalana Mine, the Société pour le Développement des Investissements en Afrique S.A. of Mali was developing the Kodieran permit and Young Poong Mining and Construction of South Korea was evaluating the Gouenso gold concession. In northeast Mali, Taghrit S.A. of Mali, owned in part by CMCWA and Oliver Gold, was exploring the Anéfis and In Darset gold exploration permits.

Current diamond production in Mali was a byproduct of artisanal gold mining. The Mali Diamond Exploration B.V. joint venture of Ashton West Africa Pty. Ltd. of Australia (51% interest) and Mink International Resources Corp. of Canada (49%) discovered another six kimberlites and continued a drilling program on their Kéniéba area diamond prospect.

Stratic Energy Corp. of Canada reprocessed existing seismic data that covered its three petroleum exploration leases in Mali.

Mali's transportation infrastructure was underdeveloped. The highway network totaled about 15,700 km, mostly in the south. The 1,286-km railroad connecting Bamako with Dakar, Senegal, and the major roads to Côte d'Ivoire were used to import mineral-related products, particularly fuels, as well as equipment and supplies.

The country had a wide variety of other mineral occurrences including barite, bauxite, copper, diatomite, granite, iron, lead, limestone, lithium, manganese, marble, nickel, peat, and zinc, but few have been developed because of the condition of the nation's transportation network and lack of local demand (United Nations, 1987). The gold rush and anticipated development activity will continue to strain Mali's

transportation and electrical power systems. Gold, despite the price drop in 1998, will likely continue to dominate the country's mineral economy. Current exploration efforts could lead to development of additional gold deposits by the turn of the century.

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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/		1994	1995	1996	1997	1998
Cement, hydraulic		15,000	13,000	12,000	10,000	10,000
Gold, mine output, gold content 3/	kilograms	6,200	7,800	8,400	19,000	25,000
Gypsum		500	450	500	100	500
Iron	kilograms	--	69	--	--	--
Phosphate		1,039	3,000	--	--	--
Salt		5,000	5,000	6,000 r/	5,000	6,000
Silver 4/	kilograms	200	250	270	800	900

r/ Revised.

1/ Includes data available through July 1999.

2/ In addition to the commodities listed, Mali produced clays, stone, and sand and gravel for local construction purposes in addition to diamond, marble, 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.