

THE MINERAL INDUSTRIES OF

BURKINA FASO, MALI, MAURITANIA, AND NIGER

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BURKINA FASO

In 2001, the mineral sector played a minor role in Burkina Faso's economy with some production of cement, gold, pumice, salt, and stone. Other mineral resources included antimony, bauxite, copper, lead, magnetite, manganese, nickel, phosphate, silver, and zinc. The gross domestic product (GDP) was estimated on the basis of purchasing power parity to be \$13.98 billion in 2001; the leading industries were agriculture and services. Burkina Faso's population was estimated to be 11.3 million in 2001 (World Bank, 2001a¹; International Monetary Fund, 2002§).

The Government agency responsible for mining is the Ministère de l'Énergie et Mines. In 1997, the Government adopted a new Mining Code with two primary objectives—to standardize all the legal measures that are used to regulate the mining sector and to amend those parts of the previous legislation that had proved inadequate and hindered future mining development. Other provisions of the 1997 Mining Code were as follows: to prevent the state from holding sole ownership of a mining title; to ensure that an exploration permit confers the automatic right for the holder to apply for a mining permit for deposits discovered within the exploration area concerned; to require a mining permit holder to begin production within 2 years of the permit being granted; and to retain a 10% free-carried state interest in the project (Mining Journal, 2000a).

In 2001, Governments of seven countries in Western Africa agreed to form a free-trade zone. The countries included Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger, and Nigeria. According to Burkina Faso's Minister of Co-operation and Integration in Africa, the agreement will work towards expanding the economic and infrastructural development in the region (Guardian Online, 2001§).

Numerous mining companies had gold interests in Burkina Faso in 2001; however, production was only from artisanal miners. Among the companies exploring were Ashanti Goldfields Company Ltd. of Ghana, Channel Resources Ltd. of Canada, Cluff Mining plc of the United Kingdom, Coronation International Mining Corp. of Canada, Delta Gold Ltd. of Australia, Echo Bay Mines Ltd. of Canada, High River Gold Mines Ltd. of Canada, Orezone Resources, Inc. of Canada, Randgold Resources Ltd. of the United Kingdom, Resolute Mining Ltd. of Australia, Semafo, Inc. of Canada, and Solomon Resources Ltd. of Canada. Artisanal miners produce about

1,000 kilograms per year (kg/yr) of gold [Mbendi Information Services (Pty.) Ltd., 2001a§].

In 2001, Metorex Ltd. of South Africa announced that it had agreed to a memorandum of understanding (MOU) with the Government of Burkina Faso regarding its 90% holding in the Perkoa zinc deposit; the Government of Burkina Faso owned the remaining 10%. The MOU allowed Metorex to proceed with a final feasibility study and to continue discussions with stakeholders and international aid agencies regarding funding for infrastructure requirements, such as roads, power, and water supply. Perkoa, which is in western Burkina Faso, is a high-grade zinc ore deposit still in development with resources of 7 million metric tons (Mt) at a grade of 17.6% zinc at a cutoff grade of 10% zinc. Planned production levels are 60,000 metric tons per year (t/yr) of zinc with an estimated mine life of 15 years (Metorex Ltd., 2000§, undated§).

During 2001, the African Development Bank Group approved two different loans totaling nearly \$50 million to encourage economic development in Burkina Faso, a country considered to be one of the poorest in the world. In April, a \$19 million loan was approved to finance the Decentralized and Participatory Rural Development Project in the Bazega and Kadiogo Provinces. Two goals of the project were to establish an environmental observatory and to increase agricultural and livestock production by performing such activities as soil improvement on 1,900 hectares of clay and development of many hectares of land for irrigated rice and other crops. In October, a \$29.76 million loan was approved to finance the Poverty Reductions Strategy Support Program. Goals of this project include strengthening the bases for growth and competitiveness, the rationalization and decentralization of public expenditures, compliance with financial accountability, and implementation of an efficient monitoring and evaluation system (African Development Bank Group, 2001a§, b§).

MALI

Mali's mineral sector was dominated by gold mining, and in early 2001, the country became the third largest gold producer in Africa after South Africa and Ghana. Mali also produced some cement, gypsum, salt, and silver. Other mineral resources included bauxite, iron ore, diamond, limestone, manganese, nickel, petroleum, phosphates, tin, and uranium. The GDP was estimated on the basis of purchasing power parity to be about \$9.82 billion in 2001; the leading industries were agriculture and services. Exports in 2001 were \$518 million; gold exports of \$287 million accounted for about 55% of all exports. Mali's population was estimated to be 10.8 million in 2001 (World

¹References that include a section twist (§) are found in the Internet References Cited section.

Bank, 2001b§; International Monetary Fund, 2002§).

The Government agency responsible for mining is the Direction Nationale de la Géologie et des Mines, which is part of the Ministère des Mines, de l'Énergie et de l'Hydraulique. In recent years, the Government revised its Mining Code by making changes to taxes and mining permits. The tax on sales by mining companies was reduced to 3% from 6%; the tax on proceeds from the transfer of shares in mining companies was reduced to 10% from 20%; and the tax on vehicle insurance for vehicles used on mining sites was eliminated. The length of tenure for medium-scale mining permits was extended to 3 from 2 years, and a 4-year permit was introduced for small-scale mining (Direction Nationale de la Géologie et des Mines, 2000; Mining Journal, 2000b).

In 2001, gold production increased by almost 50% to about 44,000 kilograms (kg) from nearly 31,000 kg in 2000 (both years include production of 2,000 kg/yr by artisanal miners). Six significant gold deposits were either in production or in a development stage in Mali (table 3). In decreasing order of production in 2001, the deposits were Morila, Sadiola Hill, Yatela, and Syama. Deposits that were in the development stage, in decreasing order of their resources, were Loulo and Segala.

The Morila open pit gold mine, 180 kilometers (km) southeast of Bamako, was officially opened in early 2001 by the President of Mali. After completing its first full year of production, in 2001, more than 19,600 kg (reported as 631,650 ounces) of gold was produced by the consortium of AngloGold Ltd. (40%), Randgold Resources Ltd. (40%), and the Government of Mali (20%). The mine was expected to yield on average about 14,000 kg/yr of gold through 2012 (Randgold Resources Ltd., 2001, p. 18).

The Sadiola Hill open pit gold mine, 80 km southwest of Kayes, produced almost 16,700 kg (536,047 ounces) of gold in 2001. The mine was operated by Société d'Exploration des Mines d'Or de Sadiola S.A. [a consortium made up of AngloGold Ltd. of South Africa (38%), IAMGOLD Corp. of Canada (38%), the Government of Mali (18%), and the World Bank's International Finance Corporation (6%)]. The mine was expected to yield on average about 12,000 kg/yr of gold through 2010 (IAMGOLD Corp., 2001, p. 3).

The Yatela open pit gold mine, 60 km southwest of Kayes and 25 km north of the Sadiola Hill mine, produced 4,073 kg (130,948 ounces) of gold in 2001 (production began in May 2001). The mine was owned by a consortium made up of AngloGold (40%), IAMGOLD (40%), and the Government of Mali (20%). The mine was to produce about 7,250 kg/yr over a 6-year period to yield about 43,500 kg (1.4 million ounces) of gold (IAMGOLD Corp., 2001, p. 6).

The Syama open pit gold mine, 75 km southwest of Sikasso in southern Mali, closed in early 2001 and produced just 1,896 kg (60,953 ounces) of gold for the year. The mine was operated by Randgold Resources Ltd. (75%), the Government of Mali (20%), and the World Bank's International Finance Corporation (5%). In early 2001, operations were mothballed pending a return to higher gold prices. Syama has resources estimated to be about 160,000 kg (5.0 million ounces) of gold (Randgold Resources Ltd., 2001, p. 24).

Two additional notable gold deposits were also being

examined for potential development in the near future. Randgold Resources Ltd. was developing the Loulo gold deposit, 220 km south of Kayes in western Mali, which has a resource estimated to be about 130,000 kg of gold. Company officials noted that the remote location of the Loulo deposit and the lack of infrastructure were significant obstacles that were delaying starting up a potential future mine at Loulo (Randgold Resources Ltd., 2001, p. 22). Semafo, Inc. was developing the Segala gold deposit located near the Loulo deposit in western Mali. In July 2001, Semafo company officials reduced the resource estimates at Segala down to 23,000 kg, noting that while the resources were lowered, the deposit was graded higher than originally thought (Northern Miner, 2001).

Numerous other mining companies had gold interests in Mali in 2001. The following lists these companies and concessions they were exploring: African Metals Corp. of Canada owned the Duroussalam, Faraba, and Lenguekoto concessions; Axmin, Inc. of Canada owned the Kofi concession; Etruscan Resources, Inc. of Canada owned the Djelimangara, Kolomba, Mogoyafara, and Sanoukou concessions; Great Quest Metals Ltd. of Canada owned the Bourdala and Kenieba concessions; the Republic of Korea's Hyundai Corp. owned the Sepola, Barani East, and Linnguekoto West concessions; Maurel & Prop, Inc. of France owned the Banankoro concession; Moydow Mines International, Inc. of Canada owned concessions in southern Mali; Nevsun Resources Ltd. of Canada owned the Tabakoto concession; Orezone Resources, Inc. of Canada owned the Kantela concession; and Robex Resources, Inc. of Canada owned the Diagounté concession.

In August 2001, the Manantali hydroelectric power station in Senegal was expected to begin supplying power to Mali. The power station consists of four 40 megawatt generators and was expected to produce 800 million kilowatt hours per year with 55% going to Mali; 30% to Senegal; and 15% to Mauritania; the three countries are members of the Organisation pour la Mise en Valeur du Fleuve Senegal (the Senegal River Basin Development Organization) (Africa Energy Intelligence, 2001a).

MAURITANIA

Mauritania's mineral sector was dominated by iron ore mining and beneficiation in 2001. Mauritania also produced cement, gypsum, petroleum refinery products, and salt. Other mineral resources included copper, diamond, gold, ilmenite, manganese, phosphate, and uranium. The GDP was estimated on the basis of purchasing power parity to be about \$5.52 billion in 2001; the leading industries were agriculture and services. Exports in 2001 were \$345 million; iron exports of \$193 million accounted for about 56% of all exports. Mauritania's population was estimated to be 2.7 million in 2001 (World Bank, 2001c§; International Monetary Fund, 2002§).

The Ministère des Mines et de l'Industrie is the Government agency responsible for the mining industry in Mauritania. In 2000, it appointed the Council for Geoscience in South Africa to provide technical supervision and advice to the Projet de Renforcement Institutionnelle de Secteur Minier (PRISM). The PRISM is a 5-year program intended to accelerate the growth of the Mauritanian mining sector with a \$16.5 million loan from

the International Development Association of the World Bank. Projects include the production of a 1:500,000-scale geologic map of the nation and 1:200,000-scale maps of areas with mineral potential. The PRISM began in September 2000 and was scheduled to run until 2004 (Mining Journal, 2000c).

In 1999, the Ministère des Mines et de l'Industrie adopted a new decree that outlined the rules concerning mining titles in the Mauritanian Mining Code. The Decret Portant sur les Titres Miniers (law No. 99/013) established four types of licenses for prospecting, exploration, exploitation, and small-scale mining exploitation [Mbendi Information Services (Pty.) Ltd., 2002§].

Société Nationale Industrielle et Minière (SNIM) was responsible for iron ore production and beneficiation. SNIM operated three open pit iron ore mines at Guelb El Rhein, Kedia d'Idjill, and M'Haoudat, all in the Tiris region in northern Mauritania. In 2001, about 10.3 Mt of iron ore was produced, most of which was exported to France, Italy, and Belgium. In October, Sphere Investments Ltd. of Australia entered into a joint venture with SNIM to develop the Guelb el Aouj deposits that contain an estimated 500 Mt of magnesite; the deposits are in northern Mauritania about 35 km from existing iron ore operations. Sphere is entitled to earn 20% in the project if it invests \$1 million in the first phase of a three-phase bankable feasibility study and can earn an additional 30% if it invests \$10 million in the second and third phases [Metal Bulletin, 2001; Mbendi Information Services (Pty.) Ltd., 2001b§].

In 2001, the Guelb Moghrein project, which was being developed by Guelb Moghrein Mines d'Akjoujt S.A. of Mauritania, was put up for sale. The project, which is within mining concession CM2 at Akjoujt, contains an estimated 2,600 metric tons (t) of cobalt, 328,000 t of copper, and about 25,700 kg (827,000 ounces) of gold (Africa Mining Intelligence, 2001).

Diamond exploration was among the principal exploration activities that took place in 2001. BHP Billiton plc of Australia, De Beers Consolidated Mines Ltd. of South Africa, Rex Diamond Mining Corporation of Canada, and Rio Tinto plc of the United Kingdom were all actively exploring for diamond in northern Mauritania. In March, Rex Diamond Mining announced the discovery of another 3 kimberlite deposits in Mauritania, thus bringing the total found on its properties to 20; of these, 12 have been sampled with 5 that yield diamond (Mining Journal, 2001).

Several international oil companies were involved in offshore oil exploration in Mauritania in 2001. In May, a consortium led by Eni of Italy, Hardman Resources NL of Australia, and Woodside Petroleum Ltd. of Australia announced the discovery of oil at the Chinguetti-1 well. Reserves were initially estimated to be 65 million barrels (Africa Energy Intelligence, 2001b; Rigzone.com, 2002§). Other companies exploring for oil offshore were Dana Petroleum plc of the United Kingdom, Fusion Oil & Gas plc of Australia, and Roc Oil Ltd. of Australia.

NIGER

Niger's mineral sector was dominated by uranium mining in 2001. Niger also produced cement, coal, gold, gypsum, molybdenum, salt, and tin. Other mineral resources included iron ore, phosphate, and petroleum. The GDP was estimated on

the basis of purchasing power parity to be about \$10.28 billion in 2001; the leading industries were agriculture and services. Exports in 2001 were \$253 million; uranium exports of \$90 million accounted for about 35% of all exports. Niger's population was estimated to be 10.8 million in 2001 (World Bank, 2001d§; International Monetary Fund, 2002§).

The Government agency responsible for mining is the Ministry of Mines and Energy. In 2000, the Government announced an offering of four oil exploration blocks with a number of tax exemptions. The exemptions included a complete waiver on taxes during the exploration phase; an exemption from duties and import tax on material, supplies, equipment and spares for oil operations; a waiver on taxes on bank loans; free import and export of oil products; and tax-free currency exchange and transfers. Once production begins, royalties will amount to 12.5% on oil and 5% on gas, and the corporate tax rate will be set at 45%. Exploration permits will be awarded for a 4-year period and be renewable twice for periods of 3 years apiece. In the case of a commercial discovery, a concession will be awarded for 15 years and be renewable for one additional 15-year period (Africa Energy Intelligence, 2000).

During 2001, construction continued on the open pit Samira Hill gold mine, 90 km west of the capital of Niamey; a 7-million-cubic-meter water dam and a 7-km pipeline and pumping station were built. Capital costs for the entire mine were estimated to be \$26 million. Production was expected to begin by the end of 2002 with about 4,200 kg of gold expected to be produced in the first year of production; mining reserves were 22,300 kg (reported as 10 Mt at a grade of 2.23 grams per metric ton gold) to be mined during a 7-year period. The mine was owned by African GeoMin Mining Development Corporation Ltd. of Niger [a consortium of Etruscan Resources, Inc. (40%), Semafo, Inc. (40%), and the Government of Niger (20%)] (Semafo, Inc., undated§).

In 2001, Niger was the world's third largest producer of uranium after Canada and Australia (Uranium Information Centre Ltd., 2002§). Niger has two main uranium producing mines, the Akouta underground mine and the Arlit open pit mine, both in northern Niger. Société des Mines de l'Air [Cogema of France (63.4%) and Nigerien Government (36.6%)] operated both mining operations that together produced 3,096 t of uranium in 2001, an increase of 201 t from 2,895 t in 2000. Production costs have been high for these two mines, and uranium products are purchased under special agreements between the Nigerien Government and customers in France and Japan [Mbendi Information Services (Pty.) Ltd., 2001c§].

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Major Sources of Information

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TABLE 1
BURKINA FASO, MALI, MAURITANIA, AND NIGER: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1997	1998	1999	2000	2001
BURKINA FASO 3/					
Cement thousand metric tons	40,000	40,000	50,000	50,000	50,000
Gold kilograms	1,089 4/	1,091 4/	886 4/	1,000	1,000
Manganese, Mn content of ore	1,000	1,000	--	--	--
Pumice and related volcanic materials	10,000	10,000	10,000	10,000	10,000
Salt	5,000	5,000	5,000	5,000	5,000
Stone, marble	100,000	100,000	100,000	100,000	100,000
MALI 5/					
Cement, hydraulic	30,000 r/	40,000 r/	30,000 r/	30,000 r/	40,000
Gold, mine output, gold content 6/ kilograms	16,323 4/	20,562 4/	23,690 4/	28,717 r/ 4/	42,288 4/
Gypsum	100	500	500	500	500
Salt	5,000	6,000	6,000	6,000	6,000
MAURITANIA 7/					
Cement	80,000	100,000 r/	100,000 r/	110,000 r/	110,000
Gypsum	80,000	100,000	100,000	100,000	100,000
Iron ore:					
Gross weight thousand metric tons	11,703 8/	11,373 8/	10,401 8/	11,450 8/	10,300
Iron content do.	7,605 4/	7,410 4/	7,475 4/	7,500	7,300
Petroleum refinery products:					
Liquefied petroleum gas thousand 42-gallon barrels	440	440	440	440	440
Gasoline do.	1,900	1,900	1,900	1,900	1,900
Kerosene do.	470	470	470	470	470
Distillate fuel oil do.	1,100	1,100	1,100	1,100	1,100
Residual fuel oil do.	2,450	2,450	2,450	2,450	2,450
Other do.	700	700	700	700	700
Total do.	7,060	7,060	7,060	7,060	7,060
Salt	5,500	5,500	5,500	5,500	5,500
NIGER 9/					
Cement, hydraulic	30,000	30,000	30,000	40,000	40,000
Coal, bituminous	150,000	145,000	168,000 4/	158,000 4/	160,000
Gold kilograms	1,000	1,000	1,000	1,000	1,000
Gypsum	1,800	2,000	1,502 4/	1,474 4/	1,500
Molybdenum concentrate, Mo content	10	10	10	10	10
Salt	3,000	2,000	2,000	2,000	2,000
Tin, mine output, Sn content	10	10	32 4/	22 4/	20
Uranium, U content	3,497 4/	3,731 4/	2,916 4/	2,895 r/ 4/	3,096 4/

r/ Revised. -- Zero.

1/ Table includes data available through August 29, 2002.

2/ Estimated data are rounded to no more than three significant digits; may not add to totals shown.

3/ In addition to the commodities listed, granite, phosphate rock, sand and gravel, and other construction material are produced, but information is inadequate to make reliable estimates of output levels.

4/ Reported figure.

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

6/ Excludes artisanal production, estimated to be about 2,000 kilograms per year.

7/ In addition to the commodities listed, modest quantities of crude construction materials (clays, sand and gravel, and stone) presumably were produced, but output was not reported quantitatively. The minimill of Societe Arabe de Fer et d'Acier en Mauritanie produced rebar and wire, but available information is inadequate to make reliable estimates of output levels.

8/ Reported by National Industrial and Mining Company.

9/ In addition to the commodities listed, phosphate rock, tungsten ore, and a variety of construction materials (clays, limestone, sand and gravel, and stone) were produced, but information is inadequate to make reliable estimates of output levels.

TABLE 2
BURKINA FASO, MALI, MAURITANIA, AND NIGER: STRUCTURE OF THE MINERAL INDUSTRIES IN 2001

(Metric tons, unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
BURKINA FASO				
Cement		Ciment du Burkina (Holcim Ltd. of Switzerland, 100%)	Ouagadougou plant	200,000
MALI				
Cement		Diamou Cement (private, 100%)	Plant 45 kilometers west of Bamako	50,000
Do.		Société Lou Kouma (private, 100%)	Bamako plant	236,000
Gold	kilograms	Société d'Exploration des Mines d'Or de Sadiola S.A. (Anglogold, 38%; Iamgold, 38%; Government, 18%; World Bank, 6%)	Sadiola Hill mine	20,000
Do.	do.	Anglogold, 40%; Randgold, 40%; Government, 20%	Morila mine	20,000
Do.	do.	Randgold, 75%; Government, 20%; World Bank, 5%	Syama mine 1/	6,000
Do.	do.	Anglogold, 40%; Iamgold, 40%; Government, 20%	Yatela mine	5,000
MAURITANIA				
Cement		Ciment de Mauritanie (private, 100%)	Nouakchott grinding plant	400,000
Gypsum		Société Arabe des Industries Métallurgiques [Société Nationale Industrielle et Minière (SNIM) (Government, 78%; private, 22%)]	Nouakchott mine	100,000
Iron ore		SNIM	Mines in northern Mauritania	12,000,000
Petroleum products	thousand 42-gallon barrels	Société Mauritanienne d'Industrie de Raffinage	Nouadhibou refinery	8,000
Salt		Société Mauritanienne des Industries du Sel	Lekhcheime mines	5,500
NIGER				
Cement		Société Nigérienne de Cimenterie (Holderbank, 77%; Government, 23%)	Malbaza plant	40,000
Coal		Société Nigérienne de Charbon d'Anour-Araren (Government, 100%)	Anour-Araren opencast operation	170,000
Gold	kilograms	Artisans	Liptako regin	1,000
Salt		Sonisalt (Government, 100%)	Adebou and Tegguida n'tessoum	3,000
Uranium		Société des Mines de l'Air (Cogema, 63.4%; Government, 36.6%)	Arlit mine	1,400
Do.		Compagnie Minière D'Akouta (Cogema, 34%; Government, 36.6%; Overseas Uranium Resources of Japan, 25%; Empresa Nacional del Uranio of Spain, 10%)	Akouta mine	2,000

1/ Closed in early 2001 due to high production costs.

TABLE 3
SELECTED SIGNIFICANT GOLD DEPOSITS IN MALI IN 2001

Deposit	Company	Location	Production (kilograms)	Resources (kilograms)	Project life/status
Morila	Anglogold Ltd. (40%), Randgold Resources Ltd. (40%), Government of Mali (20%)	180 kilometers southeast of Bamako	19,647	184,000	Operations projected through 2012.
Sadiola Hill	Société d'Exploration des Mines d'Or de Sadiola S.A. [Anglogold Ltd. of South Africa (38%), IAMGOLD Corp. of Canada (38%), Government of Mali (18%), World Bank's International Finance Corp. (6%)]	80 kilometers southwest of Kayes	16,672	121,000	Operations projected through 2010.
Yatela	Anglogold Ltd. (40%), IAMGOLD Corp. (40%), Government of Mali (20%)	60 kilometers southwest of Kayes	4,073	50,000	Operations projected through 2007.
Syama	Randgold Resources Ltd. (75%), Government of Mali (20%), World Bank's International Finance Corp. (5%)	75 kilometers southwest of Sikasso	1,896	156,000	Closed in early 2001.
Loulo	Randgold Resources Ltd. and Government of Mali	220 kilometers southwest of Kayes	--	131,000	Development.
Segala	Semafo, Inc. (75%) and Government of Mali (25%)	do.	--	23,000	Do.

-- Zero.