



# 2005 Minerals Yearbook

---

## MALI, MAURITANIA, AND NIGER

---

# THE MINERAL INDUSTRIES OF MALI, MAURITANIA, AND NIGER

By Omayra Bermúdez-Lugo

## MALI

Mali's mineral sector was dominated by gold mining. Other mineral commodities produced were clay, gypsum, limestone, marble, salt, sand and gravel, and stone for domestic consumption. The Government agency responsible for the mining sector in Mali is the National Directorate for Geology and Mines, which is part of the Ministry of Mines, Energy, and Water Resources.

In 2005, at least 15 companies were engaged in gold exploration and/or production in Mali. These included Great West Gold Inc. (formerly Adven Inc.) of the United States; African Metals Corporation (AMC), Axmin Inc., Delta Exploration Inc., Etruscan Resources Inc., Glencar Mining plc, Great Quest Metals Ltd., IAMGOLD Corp., Nevsun Resources Ltd., North Atlantic Resources Ltd., and Robex Resources Inc. of Canada; AngloGold Ashanti Ltd., which was formed by the merger of AngloGold Limited of South Africa and Ashanti Goldfields Ltd. of Ghana in April 2004; Avnel Gold Mining Ltd. and Randgold Resources Ltd. of the United Kingdom; and Resolute Mining Limited of Australia.

Malian gold production was primarily from the Kalana, the Morila, the Sadiola Hill, and the Yatela Mines. According to Randgold Resources company reports, the Loulo Mine, which was under development in 2004, poured its first gold in September and shipped its first commercial consignment of bullion in November. During the year, about 1.2 million metric tons (Mt) of ore at a feed grade of 4.5 g/t gold were mined at the Loulo Mine and yielded more than 2,110 kilograms (kg) of gold (reported as 67,984 troy ounces). These five mines produced a total of 44,230 kg of gold in 2005 (table 1). Some gold (about 60 kilograms per year) was also produced by artisanal methods (AngloGold Ashanti Ltd., 2006, p. 69; Randgold Resources Ltd. 2006, p. 7, 14; Avnel Gold Mining Ltd., 2006§<sup>1</sup>).

More-extensive coverage of the mineral industry of Mali can be found in the 2003 and 2004 U.S. Geological Survey Minerals Yearbook, volume III, Area Reports—International—Africa and the Middle East, which are available on the World Wide Web at URL <http://minerals.usgs.gov/minerals/pubs/country>.

## References Cited

- AngloGold Ashanti Ltd., 2006, 2005 annual report: Johannesburg, South Africa, AngloGold Ashanti Ltd., 268 p.  
Randgold Resources Ltd., 2006, 2005 annual report: St. Helier Jersey, Channel Islands, United Kingdom, Randgold Resources Ltd., 72 p.

---

<sup>1</sup>References that include a section mark (§) are found in the Internet Reference(s) Cited sections.

## Internet Reference Cited

- Avnel Gold Mining Ltd., 2006, Current operations, accessed August 14, 2006, at URL [http://www.avnelgold.com/mining\\_ops/current\\_ops/current\\_ops.html](http://www.avnelgold.com/mining_ops/current_ops/current_ops.html).

## MAURITANIA

Mauritania's mineral sector was dominated by iron ore mining and beneficiation. According to the Ministry of Mines and Industry (Ministère des Mines et de l'Industrie) (MMI), mining was one of the country's most important sectors to the national economy. It contributed about 12% to the gross domestic product and represented more than one-half of the country's export earnings (Ministère des Mines et de l'Industrie, 2005, p. 27). Other commodities produced in the country included cement, gypsum, and salt.

The MMI is the Government agency responsible for the mining industry. Société Nationale Industrielle et Minière (SNIM) was responsible for iron ore production and beneficiation. The company operated a mining center at the northern town of Zouerate, three open pit iron ore mines at Guelb El Rhein, Kedia d'Idjill, and M'Haoudat in northern Mauritania, port facilities at Nouadhi on the Atlantic coast, and a 700-kilometer-long railway that linked the mining center to the port facilities (Société Nationale Industrielle et Minière, 2005§). Iron ore that contained about 65% iron was mined from the Kedia d'Idjill Mine and the M'Haoudat Mine, and lower-grade ore that contained about 37% iron was mined from the Guelb El Rhein Mine (Société Nationale Industrielle et Minière, 2005§).

According to the Government, the number of foreign companies applying for prospecting licenses in the country was growing, and projects were at various development stages ranging from grassroots exploration to mine development. Large multinational companies that have explored or were exploring in the country included: Dia Met Minerals Ltd., Rex Diamond Mining Corporation, and Rio Narcea Gold Mines Ltd. of Canada; Ashton Mining Ltd., Sphere Investments Ltd., and Woodside Energy Ltd. of Australia; and the De Beers Group of South Africa. Diamond, gold, and petroleum were the main target products under exploration, although the Government reported that companies were also interested in copper, iron, lead, and zinc exploration. The country's reported identified mineral resources included about 160 Mt of phosphate rock, 120 Mt of salt, 22.6 Mt of copper, 9 Mt of gypsum, more than 1 Mt of sulfur, 400,000 metric tons (t) of peat, and 30 t of gold. Iron ore reserves were estimated to be 185 Mt of hematite ore that ranges from 60% to 68% iron and 660 Mt of lower quality magnetite ore that ranges from 36% to 40% iron (Ministère des Mines et de l'Industrie, 2005, p. 27).

In 2005, Rio Narcea Gold Mines Ltd. announced its decision to proceed with the development of the Tasiast gold project.

Capital costs for the project were estimated to be \$63.5 million and production was expected to begin in mid-2007. The company reported total measured and indicated mineral resources to be about 12.1 Mt at a grade of 3.06 grams per metric ton (g/t) gold. Proven and probable ore reserves were reported to be about 8.9 Mt at a grade of 3.08 g/t gold, and inferred resources, about 12.4 Mt at a grade of 2.25 g/t gold (Rio Narcea Gold Mines Ltd., 2006, p. 10).

Sphere continued to develop the Guelb el Aouj iron ore project in joint venture with SNIM. Sphere was to earn a 50% stake in the project by investing \$11 million towards a three-stage bankable feasibility study. The work program for stage 1 of the project, which included aerial survey and mapping, drilling, hydrogeology, marketing, metallurgical testwork, and relogging of existing drill cores, was completed in 2004 and that of stage 2A, which was focused on drilling the East deposit, began in March 2005. According to company reports, combined inferred resources at Guelb el Aouj's Centre and East deposits were estimated to be 675 Mt. Sphere estimated that high-grade magnetite concentrate at a grade of 70% iron could be recovered from both these deposits (Sphere Investments Ltd., 2006, p. 2-3).

In 2004, First Quantum Minerals Ltd. of Canada signed a letter of intent with the Government of Mauritania for the acquisition of an 80% interest in the Guelb Moghrein copper-gold deposit. Construction of mine facilities began in 2005. The company reported that logistics and difficulties in acquiring construction supplies had delayed the commissioning of the plant; the company expected to have the plant commissioned by the second quarter of 2006 and that production would begin in the third quarter of 2006. The envisioned operation is expected to produce about 30,000 metric tons per year (t/yr) of copper in concentrate and about 2,100 kg/yr (reported as 70,000 troy ounces per year; revised from 2004 Minerals Yearbook chapter) of gold in the form of copper-gold concentrates (First Quantum Minerals Ltd., 2006).

Several international oil companies, mainly Australian, were involved in offshore exploration in Mauritania in 2005. Previous exploration efforts had resulted in a series of discoveries, including the Chinguetti oilfield in 2001, the Banda oilfield in 2002, and the Tiof oilfield in 2003. As of November 18, 2005, Woodside Petroleum Ltd. of Australia held a 53.846% interest through production-sharing contracts (PSC) in the Banda and the Tiof oilfields and a 47.384% in the Chinguetti oilfield. The Chinguetti project was scheduled to be completed and to produce the first petroleum by 2006, with petroleum production averaging 75,000 barrels per day (bbl/d). Banda oilfield is located within the company's area A (PSC-A); Chinguetti and Tiof are located within the company's area B (PSC-B). The remaining partners in PSC-A were Hardman Resources Ltd. (24.3%), BG Group plc (13.084%), Fusion Oil and Gas Company (4.615%), and Roc Oil Ltd. (4.155%). The remaining partners in Tiof oilfield within PSC-B were Hardman Resources (21.6%), BG Group (11.63%), Premier Oil plc (9.231%), and Roc Oil (3.693%) and the remaining partners in the Chinguetti oilfield were Hardman Resources Ltd. (19.008%), Government-owned Groupe Project Chinguetti (12%), BG Group (10.234%), Fusion Oil and Gas (8.123%), and Roc Oil (3.250%) (Hardman Resources Ltd., 2005; Petroleum Economist, 2005).

More-extensive coverage of the mineral industry of Mauritania can be found in the 2003 and 2004 U.S. Geological Survey Minerals Yearbook, volume III, Area Reports—International—Africa and the Middle East, which are available on the World Wide Web at URL <http://minerals.usgs.gov/minerals/pubs/country>.

## References Cited

- First Quantum Minerals Ltd., 2006, 2005 annual report: Vancouver, British Columbia, Canada, First Quantum Minerals Ltd., 64 p.
- Hardman Resources Ltd., 2005, Mauritania drilling programme Labelidna-1 exploration well update: Hardman Resources Ltd. press release, November 18, 2 p.
- Ministère des Mines et de l'Industrie, 2005, Projet de renforcement institutionnel du secteur minier, Guide de l'investisseur minier en Mauritanie: Munich, Germany, Ministère des Mines et de l'Industrie, November, 64 p.
- Petroleum Economist, 2005, News in brief—Mauritania: Petroleum Economist, v. 72, no. 1, p. 43.
- Rio Narcea Gold Mines Ltd., 2006, 2005 annual report: Toronto, Ontario, Canada, Rio Narcea Gold Mines Ltd., 20 p.
- Sphere Investments Ltd., 2006, 2005 annual report: Perth, Australia, Sphere Investments Ltd., 60 p.

## Internet Reference Cited

- Société Nationale Industrielle et Minière, 2005, SNIM, a modern company in the heart of the Sahara, accessed December 7, 2005, at URL <http://www.snim.com>.

## NIGER

Mineral commodities produced in Niger were cement, coal, gold, gypsum, limestone, salt, tin, and uranium. In 2005, Niger was the world's sixth ranked producer of uranium (Uranium Information Centre Ltd., 2006§). Production of uranium decreased to 3,093 t in 2005 from 3,282 t in 2004 (table 1). Niger's main uranium resources are located within the sedimentary layers of the Iullemeden Basin. Production of uranium came from the Akouta underground mine, which was operated by Compagnie Minière d'Akouta (COMINAK), and the Arlit open pit mine, which was operated by Société des Mines de l'Air (SOMAIR). COMINAK was owned by Areva NC [formerly known as Compagnie Générale des Matières Nucléaires (COGEMA)] (34%), the Government of Niger (31%), Overseas Uranium Resources Development Company of Japan (25%), and ENUSA Industrias Avanzadas, S.A. of Spain (10%). SOMAIR was owned by Areva NC (63.4%) and the Government of Niger (36.6%) (Areva NC, 2006§).

The Samira Hill gold mine, which was commissioned during the third quarter of 2004, produced a total of 3,005 kg (reported as 96,608 troy ounces) of gold in 2005 (Semafo Inc. 2006, p. 12). The company that operated the Samira Hill Mine was Société des Mines du Liptako S.A. (SML), which was a limited-liability company owned by African GeoMin Mining Development Corporation Ltd. (AGMDC) (80%) and the Government of Niger (20%). AGMDC was, in turn, owned by Etruscan Resources Inc. (50%) and Semafo Inc. (50%).

More-extensive coverage of the mineral industry of Niger can be found in the 2003 and 2004 U.S. Geological Survey Minerals Yearbook, volume III, Area Reports—International—Africa and

the Middle East, which are available on the World Wide Web at URL <http://minerals.usgs.gov/minerals/pubs/country>.

## Reference Cited

Semafo Inc., 2006, 2005 annual report: Saint Laurent, Quebec, Canada, Semafo Inc., 61 p.

## Internet References Cited

Areva NC, 2006, Worldwide mining operations, accessed August 22, 2006, at URL <http://www.cogema.com>.  
Uranium Information Centre Ltd., 2006, World uranium mining, accessed August 21, 2006, at URL <http://www.uic.com.au/nip41.htm>.

TABLE 1  
MALI, MAURITANIA, AND NIGER: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Country and commodity	2001	2002	2003 <sup>c</sup>	2004 <sup>c</sup>	2005 <sup>c</sup>
MALI <sup>2</sup>					
Gold, mine output, gold content <sup>3</sup> kilograms	42,288	56,043	45,535 <sup>4</sup>	37,911 <sup>r,4</sup>	44,230 <sup>4</sup>
Gypsum <sup>c</sup>	500	500	500	300 <sup>r</sup>	300
Salt <sup>c</sup>	6,000	6,000	6,000	6,000	6,000
MAURITANIA <sup>5</sup>					
Cement	200,000	200,000 <sup>c</sup>	200,000	300,000 <sup>r,4</sup>	300,000
Gypsum <sup>c</sup>	100,000	100,000	34,264 <sup>4</sup>	38,940 <sup>4</sup>	39,000
Iron ore:					
Gross weight thousand metric tons	10,302 <sup>6</sup>	9,553 <sup>6</sup>	10,377 <sup>7</sup>	11,000 <sup>7</sup>	11,000
Iron content <sup>c</sup> do.	6,700	6,200	6,890	7,200	7,200
Petroleum, refinery products: <sup>c</sup>					
Liquefied petroleum gas thousand 42-gallon barrels	440	-- <sup>4</sup>	--	--	--
Gasoline do.	1,900	-- <sup>4</sup>	--	--	--
Kerosene do.	470	-- <sup>4</sup>	--	--	--
Distillate fuel oil do.	1,100	-- <sup>4</sup>	--	--	--
Residual fuel oil do.	2,450	-- <sup>4</sup>	--	--	--
Other do.	700	-- <sup>4</sup>	--	--	--
Total do.	7,060	-- <sup>4</sup>	--	--	--
Salt <sup>c</sup>	5,500	5,500	15 <sup>4</sup>	20 <sup>4</sup>	20
Steel, crude	5,000 <sup>c</sup>	5,000	5,000	5,000	5,000
NIGER <sup>8</sup>					
Cement, hydraulic <sup>c</sup>	47,000 <sup>r,4</sup>	53,700 <sup>r,4</sup>	53,700 <sup>r</sup>	53,700 <sup>r</sup>	53,700
Coal, bituminous	163,275	182,916	183,000	183,000	183,000
Gold <sup>9</sup> kilograms	30	28	30	684 <sup>4</sup>	3,005 <sup>4</sup>
Gypsum	3,205	17,652	17,700	17,700	17,700
Limestone	103,726	146,399	146,000	146,000	146,000
Salt <sup>c</sup>	2,000	2,000	2,000	2,000	2,000
Sulfuric acid:					
Gross weight	55,000	62,000	67,000 <sup>4</sup>	70,000 <sup>4</sup>	70,000
Sulfur content	18,000	20,000	22,000	23,000	23,000
Tin, mine output, Sn content	9	11	11	3,100	3,100
Uranium, U content	2,920	3,076	3,143 <sup>4</sup>	3,282 <sup>4</sup>	3,093 <sup>4</sup>

<sup>c</sup>Estimated; estimated data are rounded to no more than three digits; may not add to totals shown. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through August 23, 2006.

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

<sup>3</sup>Excludes artisanal production, which is estimated to be about 2,000 kilograms per year.

<sup>4</sup>Reported figure.

<sup>5</sup>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 Société Arabe de Fer et d'Acier en Mauritanie produced rebar and wire, but available information is inadequate to make reliable estimates of output.

<sup>6</sup>Reported by National Industrial and Mining Company.

<sup>7</sup>Reported by Ministère des Mines et de l'Industrie.

<sup>8</sup>In addition to the commodities listed, phosphate rock, tungsten ore, and a variety of construction materials (clays, sand and gravel, and stone) were produced but information is inadequate to make reliable estimates of output.

<sup>9</sup>Does not include unreported production.

TABLE 2  
MALI, MAURITANIA, AND NIGER: STRUCTURE OF THE MINERAL INDUSTRIES IN 2005

(Metric tons unless otherwise specified)

Country and commodity	Major operating companies	Location of main facilities	Annual capacity
<b>MALI</b>			
Gold	Société de la Mine d'or de Kalana (Avel Gold Mining, 80%, and Government, 20%)	Kalana Mine, 300 kilometers south of Bamako	60,000 ore.
Do.	Société des Mines de Loulo (Randgold Resources Ltd., 80%, and Government, 20%)	Loulo Mine, 350 kilometers west of Bamako	2,400,000 ore.
Do.	Morila S.A. [a subsidiary of Morila Limited of Mali, 80% (AngloGold Ashanti Ltd., 40%; Randgold Resources Ltd., 40%; Government, 20%)]	Morila Mine, 180 kilometers southeast of Bamako	4,200,000 ore.
Do.	Société d'Exploitation des Mines d'Or de Sadiola S.A. (AngloGold Ashanti Ltd., 38%; IAMGOLD Corp., 38%; Government, 18%; International Finance Corporation, 6%)	Sadiola Hill Mine, 77 kilometers south of Kayes	5,300,000 ore.
Do.	Société des Mines de Syama S.A. (Resolute Mining Limited, 80%, and Government, 20%)	Syama Mine, 300 kilometers southeast of Bamako	Undeveloped. <sup>1</sup>
Do.	Société d'Exploitation des Mines d'Or de Yatela (AngloGold Ashanti Ltd., 40%; IAMGOLD Corp., 40%; Government, 20%)	Yatela Mine, 50 kilometers south-southwest of Kayes	2,500,000 ore.
Do.	kilograms Artisanal miners	NA	60.
<b>MAURITANIA</b>			
Cement	Ciment de Mauritanie (Private Mauritanian investors, 90%, and Compañía Valenciana de Cementos Portland, 10%)	Nouakchott	545,000 cement and clinker.
Do.	Mauritano-Francaise des Ciments S.A.	do.	NA.
Iron ore	Société Nationale Industrielle et Minière (SNIM) (Government, 78%, and Arab financial and mining investors, 22%)	Guelb El Rhein, Kedia d'Idjill, and M'Haoudat Mines	12,000,000 ore.
Gypsum	Société Arabe des Industries Metallurgiques Mauritano-Koweitiennes (SAMIA)	Sebkha N'dramcha between Nouakchott and Akjoujt	NA.
Salt	Société Mauritanienne des Industries du Sel (SOMISEL)	N'terert and d'Idjill brine pits	NA.
<b>NIGER</b>			
Coal	Société Nigérienne de Charbon (SONICHAR)	Anou Araren, central Agadez region	300,000.
Gold	Société des Mines du Liptako S.A. (SML) [African GeoMin Mining Development Corporation Limited (which is owned by Etruscan Resources Inc., 50%, and Semafo Inc., 50%), 80%; Government, 20%]	Samira Hill Mine, 90 kilometers west of Niamey	NA.
Uranium	Compagnie Minière d'Akouta (COMINAK) (Areva NC, 34%; Government, 31%; Overseas Uranium Resources Development Co., 25%; ENUSA Industrias Avanzadas S.A., 10%)	Akouta underground mine, northern Niger	2,500.
Do.	Société des Mines de l'Air (SOMAIR) (Areva NC, 63.4%, and Government, 36.6%)	Arlit open pit mine, northern Niger	2,300.

NA Not available.

<sup>1</sup>According to Resolute Mining Ltd. company reports, the feasibility study on the redevelopment of the Syama Mine was completed in 2005. The company announced a total resource of about 200,000 kilograms (reported as 6.4 million troy ounces of gold). A decision to proceed with the full development of the mine had not been reached as of yearend 2005.