



2011 Minerals Yearbook

THE GAMBIA, GUINEA-BISSAU, AND SENEGAL

THE MINERAL INDUSTRIES OF THE GAMBIA, GUINEA-BISSAU, AND SENEGAL

By Omayra Bermúdez-Lugo

THE GAMBIA

Mining in The Gambia was limited to the production of industrial minerals and did not play a significant role in the country's economy. In 2011, the Government did not publish mineral production data, and information on the production of clay, ilmenite, laterite, silica sand, and zircon was not available to make reliable estimates of output. Although the Government reported production of ilmenite and rutile in 2009 and 2010 and that of rutile concentrate and zircon in 2007, there were no known ongoing titanium mineral projects in the country. The country did not produce petroleum and depended upon imports to meet its domestic energy requirements.

GUINEA-BISSAU

Mining in Guinea-Bissau did not play a significant role in the country's economy. Mineral production was limited to small-scale production of industrial minerals, such as clay, granite, limestone, and sand and gravel, but data were not sufficient to estimate output. The country's prospective mineral resources included bauxite, diamond, gold, heavy minerals, petroleum, and phosphate rock. Guinea-Bissau did not produce petroleum and depended upon imports to meet its domestic energy requirements.

Commodity Review

Metals

Bauxite and Alumina.—Bauxite Angola S.A.'s project, which consisted of the construction of a 3-million-metric-ton-per-year (Mt/yr)-capacity bauxite mine and a deepwater port, was finally launched in July 2011 at a cost of \$500 million. The Government had granted the company a mining license in 2007, but owing to political instability and to the financial crisis of 2008 and 2009, the project was kept on hold for more than 3 years. The mine will be located in the Boe region about 280 kilometers (km) east of the capital city of Bissau, and the deepwater port will be located in the southwest of the country in the city of Buba. The engineering and construction company Asperbras Group was to be in charge of the construction of the port and of the access roads and rail lines that would link the mine to the port. The project was also to include the construction of a hydroelectric plant along the Corubal River. Bauxite Angola was 70% owned by Sociedade Nacional de Petróleos de Angola (Sonangol) and Banco Africano de Investimentos. The remaining capital investments in the project were by private Angolan and Guinean investors (Bauxite Angola Sociedade Mineira e Investimentos S.A., 2011; Macahub, 2011).

Industrial Minerals

Phosphate Rock.—On February 22, Plains Creek Phosphate Corp. of Canada announced the results of a technical study [National Instrument 43–101 (NI 43–101)] regarding the economic potential of the Farim phosphate project. Measured and indicated resources of phosphate rock ore were reported to be 84 million metric tons (Mt) at an average grade of 29.9% P_2O_5 and a cutoff thickness of 1.5 meters (m). Inferred resources were estimated to be 44 Mt at an average grade of 29.6% P_2O_5 and a cutoff thickness of 1.5 m. Plains Creek owned a 50.1% interest in the Farim deposit and had the right to acquire the remaining 49.9% interest in the project from GB Minerals AG of Switzerland. The Farim deposit is located 5 km west of the town of Farim and about 120 km northeast of the capital city of Bissau. According to the company, the deposit covers a surface area of about 40 square kilometers within a Cenozoic sedimentary basin that extends from southern Guinea to Morocco. Plains Creek planned to develop an open pit mine with a capacity to produce 2.76 Mt/yr for a period of 25 years. The company started a drilling program in May and carried out geotechnical laboratory test work during the year. A bankable feasibility study for the development of the mine was expected to be completed by April 2012 (IMC Group Consulting Ltd., 2011, p. 1–2; Plains Creek Phosphate Corp., 2012, p. 1–4).

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SENEGAL

Senegal was among the world's leading producers of phosphate rock. Other mineral commodities produced in the country included basalt, cement, clays, gold, laterite, lime, limestone, petroleum, salt, and sand.

Production

Output levels for most mineral commodities increased during the year, including laterite (358%), natural gas (50%), phosphate rock (31%), basalt (21%), phosphoric acid (16%), and cement (15%). Calcium phosphate-based fertilizers, on the other hand, decreased by 17.8% to 37,000 metric tons (t); sand, by 16.4% to 1,706 t; limestone by 12.4% to 1,093 t; attapulgite by 11.8% to 180,000 t; and gold, by 6.7% to 4,089 kilograms (kg). Data on mineral production are in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities.

Commodity Review

Metals

Gold.—During the year, the Sabodala Mine produced a total of 4,089 kg of gold. Teranga Gold Corp. of Canada, which was the company that operated the mine, continued with plans to increase the production capacity at the processing plant to 4 Mt/yr from 2 Mt/yr. The expansion, which was expected to be completed by the first quarter of 2012, would increase gold production at the Sabodala Mine to 6,200 kilograms per year (kg/yr). The company expected that the blending of higher grade and (or) softer material could further increase the production capacity to between 7,800 and 10,900 kg/yr. The Sabodala Mine is located 650 km east of the capital city of Dakar. As of December 31, 2011, proven and probable gold reserves were reported to be 51,600 kg of contained gold. The company invested \$14 million in exploration at Sabodala during the year and planned to invest an additional \$20 million in 2012 (Teranga Gold Corp., 2012, p. 5–8).

Randgold Resources Ltd. of the United Kingdom continued to advance exploration activities at the Massawa gold project. During the year, the company updated the prefeasibility study it had completed for Massawa in 2010, which yielded new measured and indicated resources of 37.3 Mt at a grade of 2.65 grams per metric ton (g/t) gold and inferred resources of 3.36 Mt at a grade of 3.92 g/t gold. Metallurgical work conducted by Randgold confirmed the refractory nature of the ore, which was reported to contain submicroscopic and microscopic gold locked up in the crystal lattice of arsenopyrite. Further exploration work would focus on the evaluation of satellite deposits that could provide up to 62,000 kg of nonrefractory material, which was expected to supplement the ore feed from the Massawa deposit. Randgold held an 83.25% interest in the Massawa gold deposit in joint venture with Compagnie Senegalaise de Transports Transatlantiques Afrique de l'Ouest, which held a 6.75% interest; the Government held the remaining 10% interest (Randgold Resources Ltd., 2012, p. 53–55, 63–64).

Oromin Explorations Ltd. of Canada (43.5%) and its Saudi joint-venture partners Bendon International Ltd. (43.5%) and Badr Investment and Finance Co. (13%) announced the completion of a deep drilling program for the Oromin Joint Venture Group Ltd. (OJVG) gold project, which yielded gold mineralization in 10 new target areas. The OJVG gold project hosted a number of gold deposits, which included the Goulouma

group of deposits, and the Kerekounda, the Kourouloulou, and the Masato deposits, among others. The combined Goulouma, Kerekounda, and Kourouloulou deposits reportedly hosted indicated resources of 12.7 Mt at a grade of 3.36 g/t gold and inferred resources of 1.4 Mt at a grade of 4.09 g/t gold. Indicated resources for Masato were estimated to be 35.5 Mt at a grade of 1.28 g/t gold, and inferred resources were estimated to be 3.2 Mt at a grade of 1.25 g/t gold. Oromin and its partners planned to continue exploration activities for the OJVG project in 2012 (Oromin Explorations Ltd., 2011).

Other companies exploring for gold in Senegal included Bassari Resources Ltd. of Australia, Iamgold Corp. of Canada, and United Kingdom-based companies Silvrex Ltd., Stratex International plc, and Toro Gold Ltd.

Iron and Steel.—In May, the Government of Senegal filed for arbitration before the Court of Arbitration of the International Chamber of Commerce claiming that Luxembourg-based ArcelorMittal had breached a contract to build an integrated iron ore complex in the country. In 2007, ArcelorMittal had signed a contract to complete the construction of the Faleme iron ore mine, to upgrade the Dakar Port, and to build a 750-km railway line to link the mine to the port facilities at a cost of \$2.2 billion. The company had agreed to complete construction of the 15-Mt/yr mine by 2011, but in 2009, it announced the suspension of the project as a result of the global financial crisis. In early 2011, the parties engaged in a conciliation procedure in an attempt to reach mutually acceptable terms to solve the dispute but were unable to reach an agreement. As a result, the Government requested that ArcelorMittal pay a penalty of \$750 million. The matter was not settled as of yearend 2011 (Magnowski, 2009; ArcelorMittal, 2012, p. 170).

Titanium and Titanium Mineral Concentrates and Zircon.—On July 27, Mineral Deposits Ltd. (MDL) of Australia and ERAMET S.A. of France signed a joint-venture agreement to form a new company under the name of TiZir Ltd. to take over the operation of the Grande Côte Mineral Sands project (GCMS). The joint venture would combine MDL's 90% interest in GCMS with Eramet's 100% interest in the Tyssedal ilmenite processing plant to create a vertically integrated operation. The merger was expected to benefit both companies as MDL would secure the offtake of most of its ilmenite production from the GCMS, and ERAMET's Tyssedal plant, which was located in Norway, would receive the additional supply of high-quality ilmenite for the production of titanium slag. MDL and ERAMET each owned a 50% interest in TiZir and had equal rights in relation to the company's operation and administration. A 25-year rail and port concession was also granted by the Government for the use of an existing rail line that would connect the GCMS Mine to the Dakar Port. The estimated capital cost of Grande Côte was \$516 million, and the annual operating costs were estimated to be about \$85 million. TiZir held a 90% interest in GCMS and the Government held the remaining 10% free-carried interest. Average annual production from the GCMS project was projected to be 575,000 t of ilmenite (including small amounts of rutile and leucoxene) and 85,000 t of zircon. First production was expected to begin in late 2013, and the operation was expected to last for a period of 20 years (ERAMET S.A., 2011; Industrial Minerals, 2011; Mineral Deposits Ltd., 2012, p. 11–14).

Industrial Minerals

Cement.—During the past several years, cement production in Senegal had been on an increasing trend as the country's two domestic producers, Les Ciments du Sahel S.A. and Sococim Industries, had each increased their production capacity. Cement production, which far exceeded domestic demand, was expected to increase further with the opening of a new cement plant by Dangote Group of Nigeria. The plant, which would be located in the city of Pout, was expected to come online in 2012 and have a production capacity of 1.5 Mt/yr. Domestic consumption of cement was 2.4 Mt, or about one-half of Senegal's output. The country's cement surplus was exported to neighboring countries, in particular, to Mali. Senegal also had abundant limestone resources to support its cement industry (Arnoldsen and Waerp, 2010, 2011; Ugwu, 2011; ICR Research, 2012).

Domestic consumption of cement was mostly used for public works, including the construction of the Blaise Diagne International Airport, the Dakar-Diamniadio toll highway, the extension of the Dakar Harbor, and the construction of new roads linking the capital city of Dakar to other regions within the country and to neighboring countries within the subregion. Sococim's cement exports to neighboring countries, in particular Benin, Gambia, Guinea-Bissau, and Mali, increased by 38.6% in 2011 (Vicat Group, 2012, p. 22, 57).

Phosphate Rock.—Phosphate rock was produced by Industries Chimiques du Sénégal (ICS) and by Société Senegalaise des Phosphates de Thies (SSPT). ICS mined phosphate rock from the Taiba Mine, which is located about 100 km from Dakar. The mine had a production capacity of 2 Mt/yr. Part of the marketable phosphate rock was sent to ICS's phosphoric acid plants in Darou Khoudoss, and the remaining was sent to the Dakar Port for export. The facilities at Darou consisted of two adjacent phosphoric acid production plants that had a combined production capacity of 660,000 metric tons per year (t/yr) of P₂O₅. Most of the phosphoric acid produced was exported to India. Archeon Group of India, Indian Farmers Fertilizer Cooperative Ltd. (IFFCO), and the Government of India jointly held an 85% equity interest in ICS. SSPT owned the country's aluminium phosphate mines, which were located in Allou-Kagne, Lam Lam, and Sebikhotane (Archeon Group, 2012; Industries Chimiques du Sénégal, 2012).

Mineral Fuels and Related Materials

Petroleum.—Several international companies explored for petroleum onshore and offshore Senegal; these included African Petroleum Corp. and First Australian Resources of Australia; Africa Fortesa Corp. and Noble Energy Inc. of Houston, Texas; and Ophir Energy plc and Tullow Oil plc of the United Kingdom (African Petroleum Corp., 2011; Hinshaw, 2011; Société des Petroles du Sénégal, 2012).

Société Africaine de Raffinage, which began operating in 1963, was the country's only petroleum refinery. The refinery had a production capacity of 1.2 Mt/yr and employed 243 people. It produced butane, diesel, gasoline, gas oil, kerosene, and fuel oil for domestic consumption. The refinery was owned by Société des Petroles du Senegal (46%), Saudi Binladin Group

of Saudi Arabia (34%), and Total S.A. of France (20%) (Société Africaine de Raffinage, 2012).

Outlook

Assuming that Dangote Group's new cement plant becomes operational by the end of 2012 and that the plant produces at near nameplate capacity, Senegal's cement production is likely to increase by more than 25% in 2013. If cement consumption remains at about the same level as that of 2011, the country will have a cement surplus of nearly 3.8 Mt available for export. Owing to the high cost of transportation for construction materials, Guinea, Guinea-Bissau, Mali, and Mauritania are likely to be the destination for these exports.

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TABLE 1
THE GAMBIA AND SENEGAL: PRODUCTION OF MINERAL COMMODITIES¹

(Thousand metric tons unless otherwise specified)

Country and commodity	2007	2008	2009	2010	2011
THE GAMBIA ²					
Clay ³ metric tons	6,713 ⁴	NA ⁴	NA ⁴	NA ⁴	NA
Ilmenite	672 ⁴	-- ⁴	54,655 ⁴	69,940 ⁴	-- ^e
Laterite ³	187 ⁴	115 ⁴	103 ⁴	174 ⁴	NA
Silica sand ³	712 ⁴	1,065 ⁴	1,062 ⁴	1,121 ⁴	NA
Zircon/rutile concentrate metric tons	355 ⁴	-- ⁴	-- ⁴	-- ⁴	-- ^e
SENEGAL ^{5,6}					
Basalt ³ metric tons	400 ^e	1,037	1,321	1,167	1,415
Cement, hydraulic	3,152	3,084	3,320	4,066	4,677
Clay ³ metric tons	--	--	--	--	--
Clays, fuller's earth (attapulgitite)	138 ^r	167	181	204	180
Gold, mine output, Au content kilograms	600 ^{e,7}	600 ^{e,7}	5,055	4,381	4,089
Laterite ³ metric tons	300 ^e	71	103	226	1,035
Lime	NA	82	46	24	26
Limestone ³ metric tons	1,600 ^e	1,025	1,415	1,248	1,093
Natural gas ^e thousand cubic meters	10,000 ^r	7,000 ^r	17,500 ^r	24,000 ^r	36,000
Petroleum: ⁸					
Crude oil thousand 42-gallon barrels	317	99	249	398	403
Refinery products	648	896	739	617	738
Phosphate rock and related products:					
Calcium phosphate-based fertilizers	82	50	44	45	37
Crude rock	691	645	949 ^r	1,079 ^r	1,411
Phosphoric acid, P ₂ O ₅ content	234	180	283	312	362
Salt	212	241	222	232 ^r	258
Sand ³ metric tons	2,200 ^e	6,421	2,065	2,040	1,706

^eEstimated; estimated data are rounded to no more than three significant digits. ^rRevised. NA Not available. -- Zero.

¹Table includes data available through November 30, 2012.

²In addition to the commodities listed, The Gambia also produced a variety of construction materials (laterite, sand, and shell), but information is inadequate to make reliable estimates of output.

³Values converted from cubic meters to metric tons. Specific gravity, in grams per cubic meter—basalt, 2.8; clay, 2.55; laterite, 2.55; limestone, 2.6; and sand, 2.6.

⁴Source: Geology Department of the Republic of The Gambia.

⁵In addition to the commodities listed, Senegal also produced sand and gravel, and stone for local construction purposes, but information is inadequate to make reliable estimates of output.

⁶Source: Direction des Mines et de la Géologie, Republic of Senegal. The major source of information for the Senegal 2006 to 2010 figures is Agence National de la Statistique et de la Démographie.

⁷Government estimate of unreported production of artisanal gold.

⁸Crude petroleum values have been converted from metric tons to 42-gallon barrels using a conversion factor of 7.4 barrels of crude petroleum per metric ton.

TABLE 2
SENEGAL: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of mine facilities	Annual capacity
Attapulgit		Senegal Mines (Government, 49%)	240 kilometers south of Dakar	100.
Do.		Société Senegalaise de Phosphates de Thies S.A.	Lam Lam	NA.
Cement		Les Ciments du Sahel S.A.	Kirene plant	2,400.
Do.		Sococim Industries (Vicat Group 100%)	Rufisque, east of Dakar	3,500.
Do.		Dangote Industries Senegal SA (Dangote Group)	Pout village, Thies region	1,500. ¹
Gold	kilograms	Sabodala Gold Operations S.A. (Teranga Gold Corp., 90%, and Government, 10%)	650 kilometers east of Dakar	5,400.
Petroleum products		Total S.A. (54%), Royal Dutch Shell plc (23%), Exxon Mobil Corp. (13%), Government (10%)	Refinery, 23 kilometers from Dakar	1,226.
Phosphate rock, aluminum		Société Senegalaise de Phosphates de Thies SA	Lam Lam, Sebikhotane, and Allou-Kagne	NA.
Phosphate rock, calcium		Industries Chimiques du Sénégal Group (Archean Group, Government of India, and Indian Farmers Fertilizer Cooperative Ltd., 85%; and Government of Senegal, 15%)	Taiba Mine, 100 kilometers from Dakar	2,000.
Phosphoric acid		Industries Chimiques du Sénégal Group (Indian Farmers Fertilizer Cooperative Ltd., 85%, and Government, 15%)	Darou I plant and Darou II plant 100 kilometers from Dakar	660 P ₂ O ₅ .

Do. Ditto. NA Not available.

¹Under construction. Expected to be completed during the fourth quarter of 2012.