



# 2011 Minerals Yearbook

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**CÔTE D'IVOIRE**

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# THE MINERAL INDUSTRY OF CÔTE D'IVOIRE

By Omayra Bermúdez-Lugo

A political stalemate that resulted from contested Presidential elections in November 2010 brought Côte d'Ivoire to a standstill in early 2011 as fighting erupted between loyalists to the incumbent President, who refused to step down, and the Forces Nouvelles rebel group, who supported the opposition candidate. Fighting between the two warring parties ended in April 2011 when the Forces Nouvelles seized the capital city of Abidjan and deposed the incumbent President. As of yearend 2011, the Government was in the process of trying to consolidate peace and restore security in the country. The first legislative elections in more than a decade were held on December 11, 2011 (Nossiter, 2010; Tadjó, 2011).

Notwithstanding the post-election crisis of 2010 and 2011, mining companies in Côte d'Ivoire, with a few exceptions, were able to carry out their operations seemingly uninterrupted in 2011. Société pour le Développement Minier de la Côte d'Ivoire (SODEMI), which was the Government agency in charge of overseeing all prospecting and exploration activities in the mineral sector, reported that various prospecting and mineral exploration projects were underway. These projects included prospecting and exploring for nickel and cobalt in the north and northwest of the country, for gold and iron ore in various locations throughout the country, for manganese and phosphate rock in the southwest, and for tantalum in the north and southwest. SODEMI, in joint venture with Australian, Canadian, Chinese, French, and Indian investors, worked on these mineral projects, which were at different stages of development (Ministère des Mines, du Pétrole et de l'Énergie, 2012b).

Mineral commodities produced in Côte d'Ivoire in 2011 included gold, manganese ore, natural gas, crude petroleum, and petroleum products. In addition to these commodities, the country also produced industrial minerals, such as cement, crushed stone, and sand and gravel. Rough diamond exports from Côte d'Ivoire continued to be under United Nations (UN) sanctions during the year. Undeveloped mineral resources included bauxite, cobalt, copper, iron ore, nickel, and silica sand.

## Production

Production of most mineral commodities decreased during the year with the exception of gold, which increased by 85.9%. Cement production decreased by 47.6% to 98,900 metric tons (t); manganese ore, by 50.1% to 43,600 t; and crude petroleum, by 9.8% to 14.8 million barrels. 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.**—Despite Côte d'Ivoire's difficult sociopolitical environment in late 2010 and into 2011, the development of United Kingdom-based Randgold Resources Ltd.'s Tongon Mine continued mostly uninterrupted in 2011. The mine was officially commissioned on October 24. Tongon Mine produced about 7,800 kilograms (kg) of gold during the year and employed a total of 1,565 people; 382 out of a total of 410 permanent employees and 1,108 out of a total of 1,155 contractors were reportedly Ivorian nationals. The Tongon Mine is located in northern Côte d'Ivoire about 55 kilometers (km) south of the border with Mali. Randgold held an 89% interest in the mine through its subsidiary Société des Mines de Tongon S.A.; the remaining share was held by the Government (10%) and by Ivorian interests (1%). The estimated mine life of Tongon was 10 years, and the mine was expected to produce about 9,300 kilograms per year (kg/yr) by 2014 (Randgold Resources Ltd., 2012, p. 40–45).

Heap-leach operations at the Yaoure Mine (formerly known as the Angovia Mine) were placed on care-and-maintenance status during the first quarter of 2011 but were resumed later in the year. The mine produced 201 kg of gold in 2011 compared with 629 kg in 2010. Cluff Gold plc of the United Kingdom, which was the company that operated the mine, focused on the development of a new large mineralized sulfide deposit during the year, which was discovered underlying the mine's oxide deposits. The geology of Yaoure was described by Cluff Gold as consisting of Birimian (lower Proterozoic) metavolcanic greenstones that have been intruded by small, mainly granodioritic, bodies and syntectonic gold mineralization associated with shear zones injected by quartz veins and stockworks. Measured sulfide resources at Yaoure were reported to be 3.4 million metric tons (Mt) at an average grade of 1.5 grams per metric ton (g/t) gold, and indicated resources were reported to be 2.2 Mt at an average grade of 1.7 g/t. During the year, Cluff Gold carried out a 3,067-meter diamond drilling program for 29 holes. The company planned to continue with its drilling program and to carry out airborne magnetic surveys and interpret the remote sensing imagery to help define exploration targets outside of the company's identified geochemical anomalies (Cluff Gold plc., 2012, p. 16–19).

The Ity Mine was also forced to shut down operations for 10 weeks as a result of political tensions during the post-election crisis. Despite the shutdown, the level of production decreased only slightly, by 1%, to 1,143 kg from 1,155 kg produced in 2010 because of the addition of a third milling shift during the fourth quarter of the year. The shutdown, however, did limit the company's ability to grow its high-grade stockpile during the dry season, which required it to process ore from its lower grade stockpile during the rainy season. La Mancha Resources Inc. of

Canada planned to produce between 1,900 and 2,100 kg of gold in 2012. The mine was operated by Société des Mines d'Ity, which was a joint venture among La Mancha (45.9%), SODEMI (44.1%), and the Government (10%) (La Mancha Resources Inc., 2012, p. 8, 15; Ministère des Mines, du Pétrole et de l'Énergie, 2012b).

Production at Bonikro Mine was suspended for 6 months as a precautionary measure taken during the civil unrest. Bonikro Mine is located in south-central Côte d'Ivoire about 240 km northwest of the capital city of Abidjan. Newcrest Mining Ltd. of Australia acquired an 89% interest in the mine in September 2010 through a merger with Lihir Gold Ltd., another Australian company. The remaining reserve at Bonikro was reported to be about 34,200 kg of gold (Newcrest Mining Ltd., 2012, p. 20, 46).

**Iron Ore.**—Tata Steel Ltd. of India (75%) in joint venture with SODEMI (25%) continued with plans to develop the Mount Gao and the Mount Nimba iron ore deposits through their joint-venture company Tata Steel Côte d'Ivoire. In 2011, however, the company reported that exploration work was put on hold because of rising security concerns as a result of the post-election crisis. The company completed a helicopter-borne geophysical survey that covered 811 square kilometers (km<sup>2</sup>) for the Mount Gao prospect and a detailed 1:10,000-scale geologic map for an area of 100 km<sup>2</sup> (Tata Steel Ltd., 2011, p. 68–69). Other undeveloped iron ore deposits included the Mount Klahoyo deposit, which was a 670-Mt magnetite deposit located 600 km northwest of Abidjan, and the 150-Mt Monogaga-Victory deposit, which is located west of the city of Sassandra in southwestern Côte d'Ivoire (Kouamouo, 2011; Société pour le Développement Minier de la Côte d'Ivoire, undated).

**Manganese.**—China National Geological and Mining Corp. (CGM), planned to increase the production capacity at its Lauzoua/Mokta Mine to 500,000 metric tons per year (t/yr) of manganese ore from 300,000 t/yr. The mine, which is located in the Department of Lahou about 180 km west of Abidjan, was owned by Compagnie Minière du Littoral (CML). Production was exported to China and Ukraine. CML was a joint venture among SODEMI (51%), CGM (39%), and private interests (10%) (Kouamouo, 2011; Société pour le Développement Minier de la Côte d'Ivoire, undated).

**Nickel.**—Sama Resources Inc. of Canada, which was the company that held the mining exploration rights to the Samapleu nickel-copper sulfide deposit, continued with its exploration program in 2011. During the year, the company announced that it planned to carry out a preliminary economic assessment study for Samapleu during the first half of 2012 to evaluate the possibility of developing an open pit mine. The company had acquired the rights to Samapleu in March 2010 by purchasing all the issued and outstanding common shares of Sama Nickel Corp. (a Canadian company), which in turn held 100% interest in Samapleu through its wholly owned subsidiary Sama Nickel Côte d'Ivoire SARL. The Samapleu project covers an area of 446 km<sup>2</sup> and is located about 600 km northwest of Abidjan. Sama Nickel held a 66.6% interest in the project and SODEMI held the remaining 33.3% interest. In addition to Samapleu, SODEMI also planned to develop the nickel laterite

deposits at Founbesso and Sipilou in joint venture with TAU Group of Canada (Kouamouo, 2011; Sama Resources Inc., 2011; 2012, p. 8, 16–17).

### *Industrial Minerals*

**Cement.**—Ciments d'Afrique (Cimaf) of Morocco planned to build a 500,000-t/yr cement plant in the town of Yopougon, which is located about 15 km east of Abidjan. A ceremony to commemorate the beginning of construction work was held on November 17 in Yopougon. The plant, which was expected to be commissioned in July 2013, would process imported clinker from Ciments de l'Atlas, which was Cimaf's parent company in Morocco (Cissé, 2011).

Dangote Industries (Côte d'Ivoire) Ltd. also planned to build a cement import terminal in Abidjan with a capacity to store 1 million metric tons per year (Mt/yr) of cement. The import terminal was scheduled to be commissioned during the second half of 2013. The terminal was also expected to supply Côte d'Ivoire's neighboring countries (Aregbesola, 2011; Dangote Cement plc, undated).

**Diamond.**—On April 28, 2011, pursuant to resolution 1980 (2011), the UN Security Council decided to renew until April 30, 2012, the measures in place to prevent any country from importing rough diamond from Côte d'Ivoire. The restrictions imposed on Côte d'Ivoire by resolution 1643 (2005) failed to prevent the export of Ivorian rough diamond before, during, and after the post-election conflict, and production in the diamond fields of northern Côte d'Ivoire continued unabated despite the sanctions. Regional as well as international buyers continued to procure diamond from the deposits of Seguela, and Ivorian rough diamond continued to reach international markets using neighboring countries as the point of transit to these markets. Although during the last quarter of 2011, Government officials had been redeployed to the northern parts of Côte d'Ivoire where all diamond mines were located, the Government reportedly lacked the resources to have these officials carry out their basic duties effectively. Customs officials, which had also been redeployed to the north, had not yet been tasked with overseeing diamond mining activities in these areas (United Nations Operation in Côte d'Ivoire, undated; United Nations Security Council, 2011a, p. 13; 2011b, p. 54–55).

Because of the civil unrest in the country, Côte d'Ivoire had not become an active participant in the Kimberley Process Certification Scheme (KPCS). The KPCS is an international certification system established to stop the trade in conflict diamond, the proceeds of which could be used by rebel movements and their allies to finance violence in the process of seeking to undermine legitimate governments. As of yearend, Côte d'Ivoire had yet to formally signal its interest in participating in the certification scheme by notifying the Chair of the KPCS and indicating which authority of the Government would be responsible for implementing the provisions of the KPCS (United Nations Security Council, 2011a, p. 13; 2011b, p. 54–55).

## Mineral Fuels

**Petroleum.**—The Ministry of Mines reported that more than 200 oil wells had been drilled in the country and that nearly 62,250 km of two-dimensional seismic data and 11,482 km<sup>2</sup> of three-dimensional seismic lines had been completed. Of the number of wells drilled, 103 were exploration wells, 59 were development wells, and the remaining wells were appraisal wells. Petroleum reserves were estimated to be 339 million barrels, and natural gas reserves were estimated to be 1,240 billion cubic feet. By yearend 2011, 19 of a total of 33 blocks had been awarded to 11 petroleum companies and 14 blocks were still available for development (Ministère des Mines, du Pétrole et de l'Énergie, 2012a).

## Outlook

Despite the end of hostilities in 2011, in the short run, Côte d'Ivoire's mineral sector is likely to face challenges, as the country's energy, port, and road infrastructure that could support mining operations is in poor repair. Steps taken by the Government to consolidate peace and to restore security are likely to attract mining exploration companies to the country. Growth in the cement industry is also likely as installed cement production capacity far exceeds current output, and restoration projects to address the country's infrastructure needs are likely to come online in the near future if the funding is available. Existing gold mining operations would also add to the growth of the sector as the ramping-up of production expansion plans slowly come online in the next 2 to 5 years. Planned expansions in manganese production and the development of new manganese deposits are also likely to add value to the sector. In the longer run, the development of the country's nickel, chromite, cobalt, and iron ore resources could also take place. The end to Côte d'Ivoire's embargo on rough diamond exports would likely depend on the country's consolidation of peace and security and on the Government's efforts to achieve and maintain minimum Kimberley Process standards for compliance.

## References Cited

- Aregbesola, Issac, 2011, Dangote to establish cement factory in Ivory Coast: Lagos, Nigeria, Business Day Media Ltd., August 1. (Accessed April 9, 2012, at <http://www.businessdayonline.com/NG/index.php/news/76-hot-topic/25430-dangote-to-stablish-cement-factory-in-ivory-coast>.)
- Cissé, C.E., 2011, Production de ciment à Abidjan—Soro lance les travaux d'une usine de 20 milliards Fcfa: Abidjan.net, November 18. (Accessed January 8, 2013, at <http://news.abidjan.net/h/416913.html>.)
- Cluff Gold plc, 2012, 2011 annual report and accounts: London, United Kingdom, Cluff Gold plc, 64 p.
- Dangote Cement plc, [undated], Dangote Industries (Côte d'Ivoire) Ltd.: Lagos, Nigeria, Dangote Cement plc. (Accessed April 9, 2012, at <http://www.dangcem.com/CoteDIvoire>.)
- Kouamou, Theophile, 2011, Côte d'Ivoire—Ambitions contraires: Jeune Afrique, January 28. (Accessed February 6, 2013, at <http://www.jeuneafrique.com/Articles/Dossier/ARTJAJA2611p089-090.xml/or-mines-tsci-sodemicote-d-ivoire-ambitions-contraires.html>.)
- La Mancha Resources Inc., 2012, 2011 annual report: Montreal, Quebec, Canada, La Mancha Resources Inc., 70 p.
- Ministère des Mines, du Pétrole et de l'Énergie, 2012a, Hydrocarbures—Statistiques d'Activités: Ministère des Mines, du Pétrole et de l'Énergie. (Accessed September 10, 2012, at <http://energie.gouv.ci/index.php/hydrocarbures/statistiques-activites.html>.)
- Ministère des Mines, du Pétrole et de l'Énergie, 2012b, Mines et Géologie—Statistiques d'Activités: Ministère des Mines, du Pétrole et de l'Énergie. (Accessed September 10, 2012, at <http://energie.gouv.ci/index.php/mines-et-geologie/statistiques-dactivites.html>.)
- Newcrest Mining Ltd., 2012, 2011 annual report: Melbourne, Victoria, Australia, Newcrest Mining Ltd., 120 p.
- Nossiter, Adam, 2010, Standoff set up with 2 Ivory Coast Presidents: The New York Times, December 3. (Accessed January 30, 2013, at <http://www.nytimes.com/2010/12/04/world/africa/04ivory.html>.)
- Randgold Resources Ltd., 2012, 2011 annual report: London, United Kingdom, Randgold Resources Ltd., 185 p.
- Sama Resources Inc., 2011, Sama Resources announces new massive sulfide intersections and discovery of massive chromite occurrences at its Samapleu nickel-copper project—Côte d'Ivoire: Vancouver, British Columbia, Canada, Sama Resources Inc., December 6, 3 p.
- Sama Resources Inc., 2012, Condensed interim consolidated financial statements for the three and six months ended March 31, 2012: Vancouver, British Columbia, Canada, Sama Resources Inc., 30 p.
- Société pour le Développement Minier de la Côte d'Ivoire, [undated], Explorations en Partenariat: Société pour le Développement Minier de la Côte d'Ivoire. (Accessed September 10, 2012, at [http://www.sodemi.ci/Activite\\_Geologique\\_Exploration\\_Partenariat.html](http://www.sodemi.ci/Activite_Geologique_Exploration_Partenariat.html).)
- Tadjo, Véronique., 2011, Côte d'Ivoire—Of saviours, God and domination—The rise and fall of Laurent Gbagbo: AllAfrica Global Media, May 20. (Accessed August 2, 2011, at <http://allafrica.com/stories/201105200001.html>.)
- Tata Steel Ltd., 2011, 104th annual report 2010–2011: Mumbai, India, Tata Steel Ltd., 237 p.
- United Nations Operation in Côte d'Ivoire, [undated], Protecting civilians and supporting the Government in DDR and security sector reform: United Nations. (Accessed March 13, 2012, at <http://www.un.org/en/peacekeeping/missions/unoci/>.)
- United Nations Security Council, 2011a, Letter dated 17 October 2011 from the Chair of the Security Council Committee established pursuant to resolution 1572 (2004) concerning Côte d'Ivoire addressed to the President of the Security Council: United Nations Security Council report S/2011/642, 34 p.
- United Nations Security Council, 2011b, Letter dated 20 April 2011 from the Chair of the Security Council Committee established pursuant to resolution 1572 (2004) concerning Côte d'Ivoire addressed to the President of the Security Council: United Nations Security Council report S/2011/272, 80 p.

TABLE 1  
CÔTE D'IVOIRE: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

Commodity <sup>2</sup>		2007	2008	2009	2010	2011
Cement <sup>3</sup>		468,767	360,034	283,400	188,800 <sup>r</sup>	98,900
Columbium (niobium) and tantalum:						
Columbite	kilograms	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	--
Tantalite	do.	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	-- <sup>r</sup>	--
Crushed stone, granite <sup>4</sup>	thousand metric tons	1,126	1,090	1,005	1,095	1,100 <sup>e</sup>
Gold, mine output, Au content <sup>5</sup>	kilograms	1,243	4,205	6,947	5,310	9,871
Manganese ore:						
Gross weight		94,620 <sup>r</sup>	176,561 <sup>6</sup>	161,300 <sup>r,7</sup>	87,400 <sup>r,7</sup>	43,600 <sup>7</sup>
Mn content (43%–45%)		40,687	75,921	72,585	39,330	19,620
Natural gas	million cubic meters	1,574	1,657 <sup>r</sup>	1,540 <sup>r</sup>	1,666 <sup>r</sup>	1,600 <sup>e</sup>
Petroleum:						
Crude	thousand 42-gallon barrels	17,676 <sup>r</sup>	16,745 <sup>r</sup>	19,882 <sup>r</sup>	16,400	14,800
Refinery products	do.	25,600 <sup>r</sup>	25,900 <sup>r</sup>	25,000 <sup>r</sup>	20,400 <sup>r</sup>	20,000 <sup>e</sup>
Sand and gravel	cubic meters	NA	NA <sup>r</sup>	NA <sup>r</sup>	93,200 <sup>r</sup>	90,000 <sup>e</sup>
Sulfuric acid		3,000 <sup>e</sup>	3,000 <sup>e</sup>	NA	NA	NA

<sup>e</sup>Estimated data are rounded to no more than three significant digits. do. Ditto. NA Not available. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through December 31, 2012.

<sup>2</sup>Although rough diamond exports continued to be under a United Nations embargo, rough diamond was estimated to continue to be produced by artisanal miners. Available information, however, was inadequate to make reliable estimates of output.

<sup>3</sup>Based on reported exports of hydraulic cement.

<sup>4</sup>The crushed stone series, which before 2007 was reported to be exports of gravel and crushed stone, has been revised to reflect crushed stone data only as reported by the Ministry of Mines, Petroleum, and Energy.

<sup>5</sup>Does not include production from artisanal mining.

<sup>6</sup>Reported manganese ore exports.

<sup>7</sup>As reported by the International Manganese Institute.

TABLE 2  
CÔTE D'IVOIRE: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement		Société des Ciments d'Abidjan	Abidjan plant	750,000
Do.		Société des Ciments du Sud-Ouest	San Pedro	100,000
Do.		Société de Ciments et Matériaux (Holcim Ltd.)	Abidjan plant	800,000
Gold	kilograms	Equigold Mines CI SA (Newcrest Mining Ltd., 89.9%, and Government, 10.1%)	Bonikro Mine, 240 kilometers northwest of Abidjan	5,000
Do.	do.	Société des Mines d'Ity [La Mancha Resources Inc., 45.9%; Société pour le Développement Minier (SODEMI), 44.1%; Government, 10%]	Ity Mine, 700 kilometers from Abidjan	1,900
Do.	do.	Société des Mines de Tongon SA (Randgold Resources Ltd., 89%; Government, 10%; local Ivorian company, 1%)	Tongon Mine, northern Côte d'Ivoire, 55 kilometers south of the border with Mali	9,000
Do.	do.	Yaouré Mining SA (Cluff Gold plc, 90%, and Government, 10%)	Angovia Mine, 40 kilometers northwest of Yamoussoukro	1,240
Manganese	do.	Compagnie Minière du Littoral (Société pour le Développement Minier de la Côte d'Ivoire (SODEMI), 51%; China National Geological and Mining Corp., 39%; private interests, 10%)	Lauzoua/Mokta Mine, 180 kilometers west of Abidjan	300,000
Do.	do.	Dharni Sampda Private Ltd.	Bondoukou Mine	NA <sup>1</sup>
Petroleum, crude	thousand 42-gallon barrels	Canadian Natural Resources Ltd., 57.61%; Svenska Petroleum Exploration AS, 27.39%; Société Nationale d'Opérations Pétrolières de la Côte d'Ivoire (Petroci), 15%	Baobab oilfield, offshore	17,520
Do.	do.	Canadian Natural Resources Ltd., 58.67%; Tullow Oil plc, 21.33%; Société Nationale d'Opérations Pétrolières de la Côte d'Ivoire (Petroci), 20%	East Espoir oilfield, offshore	6,700
Petroleum products	42-gallon barrels per day	Société Ivoirienne de Raffinage (Government, 100%)	Abidjan	60,000

Do., do. Ditto. NA Not available.

<sup>1</sup>It was not clear whether the mine was operational in 2010 and (or) in 2011 .