



2007 Minerals Yearbook

BENIN, BURKINA FASO, AND SAO TOME E PRINCIPE

THE MINERAL INDUSTRIES OF BENIN, BURKINA FASO, AND SAO TOME E PRINCIPE

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BENIN

Benin's economy was based primarily on agriculture; cotton accounted for about 80% of export earnings and about 40% of the gross domestic product (GDP) (U.S. Department of State, 2008). The mineral industry, which was limited to the production of cement, clay, gold, limestone, marble, and sand and gravel, did not play a significant role in the country's economy.

Production

Clay production increased by about 7% to 77,295 metric tons (t) in 2007 from 72,196 t in 2006; gold production decreased by 20.8% to 19 kilograms (kg); gravel production increased by 140% to 25,348 cubic meters from 10,558 cubic meters; marble production increased by 23% to 342 t from 278 t; and limestone production increased by 15.5% to about 1.06 million metric tons (Mt) from 915 thousand metric tons. Data on mineral production are in table 1.

Structure of the Mineral Industry

Cement was produced by Ciments du Benin S.A., Société des Ciments d'Onigbolo, and Société des Ciments du Benin. These companies had a combined cement production capacity of 1.43 million metric tons per year (Mt/yr) (table 2). Gold was produced by artisanal miners from gold veins near the villages of Kwatena and Tchantangou in the Atakora Mountains in northwestern Benin, and from alluvial sediments along the Perma River and its tributaries.

Commodity Review

Mineral Fuels

Petroleum.—Benin ceased petroleum production from its Seme oilfield in 1998; however, at least one company, Kosmos Energy LLC of the United States, explored for petroleum in 2007. Kosmos, through its subsidiary Kosmos Energy Benin HC, had a 40% working interest in an exploration license for Block 4, which is located about 30 kilometers (km) offshore Benin. Kosmos's venture partners were Kerr-McGee Benin Consortium S.A. (an affiliate of Kerr-McGee Corp. of the United States) (40%) and Petronas Carigali Overseas Sdn Bhd of Malaysia (20%). In 2007, Kosmos processed and interpreted data from a three-dimensional (3-D) seismic survey and drilled a well on Block 4, which proved not to be commercially viable. The company planned to continue evaluating Block 4 to determine the possibility of developing other prospects (Kosmos Energy LLC, 2008).

References Cited

Kosmos Energy LLC, 2008, Our assets—Block 4: Kosmos Energy LLC. (Accessed December 19, 2008, at <http://www.kosmosenergy.com/benin.html>.)
U.S. Department of State, 2008, Benin: U.S. Department of State background note. (Accessed December 19, 2008, at <http://www.state.gov/r/pa/ei/bgn/6761.htm>.)

BURKINA FASO

In 2007, mining did not play a significant role in Burkina Faso's economy; however, the development of several new gold mines and ongoing exploration could have a positive effect on the economy in the near future. Production of mineral commodities included cement, dolomite, gold, granite, marble, phosphate rock, pumice and related volcanic materials, and salt. Investments by French companies accounted for about 70% of total foreign direct investment in the country, although investments in mineral exploration and development were mostly by Australian and Canadian companies (U.S. Department of State, 2008). As of June 2007, at least 245 mineral exploration licenses had been granted in the country compared with 230 in 2006 (Mining Journal, 2008, p. 3).

Structure of the Mineral Industry

High River Gold Mines Ltd. (High River) of Canada through its subsidiary Société des Mines de Taparko (Somita S.A.) operated the Taparko-Boroum gold mine. Canada-based Centram Exploration Ltd. (Centram) in joint venture with Crossland Uranium Mines Ltd. (Crossland) of Australia explored for uranium. Cluff Gold plc and Etruscan Resources Inc. of Canada continued to work on the development of their respective gold mines throughout the year. Gryphon Minerals Ltd. of Australia; Randgold Resources Ltd. of the United Kingdom; and Canadian companies Channel Resources Ltd., Goldbelt Resources Ltd., Orezone Resources Inc., Riverstone Resources Inc., Sanu Resources Ltd., Semafo Inc., and Volta Resources Inc. continued to explore for gold. Etruscan also explored for copper. Table 2 is a list of major mineral industry facilities. AIM Resources Ltd. of Australia continued with the development of the Perkoa zinc deposit.

Production

Gold production increased by about 43% owing to the opening of the Taparko-Boroum gold mine in late 2007. Mineral production data for other mineral commodities produced in Burkina Faso are estimated and are provided in table 1.

Commodity Review

Metals

Gold.—High River began commercial gold production from the Taparko-Boroum Mine in September 2007. Before the opening of the Taparko-Boroum Mine, the only industrial gold mine in the country had been the Poura Mine, which was closed in 1998 reportedly owing to low gold prices and managerial problems. The Government was in the process of accepting bids for the redevelopment of the Poura Mine, which has estimated resources of about 450,000 t of ore at an average grade of about 12 grams per metric ton (g/t) gold. Initial annual production from the Taparko-Boroum Mine was expected to be about 3,100 kg (reported as 100,000 troy ounces) and to increase to about 4,300 kg (reported as 140,000 troy ounces) by 2010. High River held a 90% interest in the mine, and the Government held the remaining 10%. Nonindustrial gold production in the country came from artisanal miners. About 200,000 artisanal gold miners were estimated to work in more than 200 mining sites throughout the country (High River Gold Mines Ltd., 2007; International Monetary Fund, 2008, p. 64-68; U.S. Department of State, 2008).

Kalsaka Mining SA [a joint venture among Cluff (78%), IMARB Indústria Metalúrgica of Brazil (12%), and the Government (10%)] continued to work on the development of the Kalsaka gold project, which is located about 150 km northwest of the capital city of Ouagadougou. Construction work was reportedly on schedule, and the mine was expected to be operational by the second half of 2008. Total measured, indicated, and inferred resources for Kalsaka were estimated to be 15.4 million metric tons (Mt) at an average grade of 1.6 g/t gold based on a cutoff grade of 0.5 g/t gold. The mine was expected to produce about 1,900 kilograms per year of gold (reported as 60,000 troy ounces) (Mining Journal, 2008, p. 9).

Etruscan reported that construction work at its 90% owned Youga gold property, which is located about 180 km from Ouagadougou, was near completion and that commissioning of the main plant circuits and the first gold pour were scheduled to be completed by yearend. Gold reserve estimates at the Youga Mine were reported to be 6.6 Mt at an average grade of 2.7 g/t gold (Etruscan Resources Inc., 2007).

Semafo was in the final phase of construction of the Mana gold mine. In December, the company announced that all infrastructure projects had been completed and all operational equipment had been delivered to the mine site. A crushing circuit had been installed and was to be commissioned in January 2009. The company expected to begin producing gold at Mana in mid-February 2009. Measured resources were estimated to be about 2.2 Mt at a grade of 1.90 g/t gold, and indicated resources were estimated to be 2.7 Mt at a grade of 2.13 g/t gold. Semafo held a 90% interest in the Mana gold mine through its subsidiary Semafo Burkina Faso S.A. (Semafo Inc., 2007, 2009).

Manganese.—On April 20, the Ministry of Mines and Energy granted Burkina Manganèse S.A.R.L a mining permit for the Kiere manganese deposit, which is located near the village of Kiere in the Province of Tuy. Burkina Manganèse was in the

process of finding a suitable partner for the project to undertake the development of a rail system and port facilities in Abidjan, Côte d'Ivoire. The Kiere Mine was expected to be in operation by mid-2008 (Burkina Manganèse S.A.R.L., 2007).

Zinc.—According to AIM Resources company reports, construction work at the Perkoa Mine began in March 2006, and in June 2007, the development of the box cut, which forms the main entry point for a portal and decline to the mine, was completed. Construction of the accommodation facilities for mine workers and related office infrastructure had also begun, and the installation of a water treatment facility and fuel storage facility was underway. In August, the company signed a long-term sales agreement with Votorantim Metais Ltda. of Brazil for the sale of zinc concentrates from the Perkoa Mine. Votorantim Metais planned to process the zinc concentrates through the Juiz de For zinc smelter in Brazil and the Cajamarquilla zinc smelter in Peru. The Perkoa Mine is located in Sanguie Province about 120 km from Ouagadougou and 35 km from Koudougou, the country's third largest town. Kougoudou is linked by road to Côte d'Ivoire, Ghana, and Togo, and by rail to Abidjan Port. AIM Resources planned to use the railway to transport the ore to Abidjan Port once the mine is in operation rather than use road transport through Ghana to Tema Port, although the two ports are equidistant to the mine. The mineral resource at Perkoa was estimated to be 6.7 Mt at a grade of 16.4% zinc and 35.4 g/t silver. The main sulfides contained in the ore are pyrite, pyrrhotite, and sphalerite. The Perkoa Mine was expected to produce about 70,000 metric tons per year of zinc. AIM Resources through its subsidiary Nantou Mining Ltd. would own a 90% interest in the project and the Government would own 10% free-carried interest (Australia's Paydirt, 2007; AIM Resources Ltd., 2007a, b).

References Cited

- AIM Resources Ltd., 2007a, Perkoa site update: Sydney, Australia, AIM Resources Ltd. press release, November 19, 2 p.
- AIM Resources Ltd., 2007b, Perkoa zinc concentrates sales agreements: Sydney, Australia, AIM Resources Ltd. press release, August 30, 2 p.
- Australia's Paydirt, 2007, Perkoa moves into construction at high speed: Australia's Paydirt, Paydirt Media Pty Ltd., February, p. 18-21.
- Burkina Manganèse S.A.R.L., 2007, Burkina Manganèse S.A.R.L. announces mining permit for Kiere Mine: Ouagadougou, Burkina Faso, Burkina Manganèse S.A.R.L. press release, April 20, 1 p.
- Etruscan Resources Inc., 2007, Etruscan's Youga gold mine nears completion: Halifax, Nova Scotia, Canada, Etruscan Resources Inc. press release, October 3, 6 p.
- High River Gold Mines Ltd., 2007, High River Gold achieves commercial production at the Taparko-Boroum gold mine: Toronto, Ontario, Canada, High River Gold Mines Ltd. press release, September 26, 2 p.
- International Monetary Fund, 2008, Burkina Faso—Selected issues: Washington, DC, International Monetary Fund, May, 69 p.
- Mining Journal, 2008, Burkina Faso—A supplement to Mining Journal: Mining Journal, February, 16 p.
- Semafo Inc., 2007, Mana gold project approaches start-up: Montreal, Quebec, Canada, Semafo Inc. press release, September 25, 2 p.
- Semafo Inc., 2009, Operations: Montreal, Quebec, Canada, Semafo Inc. (Accessed January 23, 2009, at http://www.semafo.com/operations_mineral_reserves.html.)
- U.S. Department of State, 2008, Foreign direct investment, chapter 6 of U.S. Department of State, 2008, Country commercial guide: Washington, DC, U.S. Department of State. (Accessed December 29, 2008, at <http://ouagadougou.usembassy.gov/chapter6-15.html>.)

SAO TOME E PRINCIPE

Mining did not play a significant role in Sao Tome e Principe's economy, which was based primarily on agriculture. Since 2005, however, the country has received about \$78 million in petroleum bonuses from international oil companies exploring for petroleum in the Joint Development Zone (JDZ). The JDZ is an overlapping maritime boundary that is prospective for petroleum and is located about 200 km offshore Nigeria. Nigeria has a 60% interest in the JDZ and Sao Tome e Principe has a 40% interest (International Monetary Fund, 2008, p. 1; U.S. Department of State, 2008).

Production

Mineral production was limited to clay and volcanic rock; potential exists, however, for the development of the country's petroleum industry. All other mineral product requirements were imported.

Commodity Review

Mineral Fuels

Petroleum.—In 2007, Addax Petroleum Corp. of Canada and China Petroleum and Chemical Corp. (SINOPEC) contracted

the *Aban Abraham* deepwater drillship to drill exploratory and appraisal wells on 10 of the 18 prospects that had been identified on Blocks 2, 3, and 4 of the JDZ. Drilling was scheduled to begin during the fourth quarter of 2008. Addax also announced that it had agreed to acquire Esso Exploration and Production Nigeria-Sao Tome (One) Ltd.'s 40% working interest in Block 1 of the JDZ. Chevron Corp. of the United States (45.9 %) was the other majority interest holder in Block 1 (Addax Petroleum Corp., 2007).

References Cited

- Addax Petroleum Corp., 2007, Addax Petroleum announces agreement to acquire interest in deepwater joint development zone: Calgary, Alberta, Canada, Addax Petroleum Corp. press release, September 25, 2 p.
- International Monetary Fund, 2008, Sao Tome and Principe—Public and natural resources management development policy grant: Washington, DC, International Monetary Fund, May 19, 36 p.
- U.S. Department of State, 2008, Sao Tome e Principe: U.S. Department of State background note. (Accessed December 19, 2008, at <http://www.state.gov/t/pa/ei/bgn/5434.htm>.)

TABLE 1
BENIN AND BURKINA FASO: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Country and commodity	2003	2004 ^e	2005 ^e	2006 ^e	2007 ^e	
BENIN						
Cement, hydraulic ^c	thousand metric tons	1,100 ^f	1,100 ^f	1,100 ^f	1,489 ^{r,2}	1,550 ^{p,2}
Clay ^e		21,000	21,000	21,000	72,196 ^{r,2}	77,295 ²
Gold	kilograms	20	20	20	24 ^{r,2}	19 ²
Gravel	cubic meters	28,500	29,000	29,000	10,558 ^{r,2}	25,348 ²
Limestone	thousand metric tons	NA	NA	NA	915	1,057 ²
Marble		NA	NA	NA	278	342 ²
Sand	thousand cubic meters	NA	NA	NA	5,250	5,500 ^p
BURKINA FASO³						
Cement ^c		30,000	30,000	30,000	30,000	30,000
Dolomite ^c	cubic meters	3,000	3,000	3,000	3,000	3,000
Gold	kilograms	770	1,125 ²	1,397 ²	1,571 ²	2,250 ²
Granite ^c	cubic meters	300,000	300,000	300,000	300,000	300,000
Phosphate rock:^c						
Gross weight		2,400	2,400	2,400	2,400	2,400
P ₂ O ₅ content		650	650	650	650	650
Pumice and related volcanic materials ^c		10,000	10,000	10,000	10,000	10,000
Salt ^c		5,000	5,000	5,000	5,000	5,000
Stone, marble ^c		100,000	100,000	100,000	100,000	100,000

^eEstimated; estimated data are rounded to no more than three significant digits. ^pPreliminary. ^rRevised. NA Not Available.

¹Table includes data available through December 19, 2008.

²Reported figure.

³In addition to the commodities listed, sand and gravel and other construction materials are produced, but information is inadequate to make reliable estimates of output.

TABLE 2
 BENIN AND BURKINA FASO: STRUCTURE OF THE MINERAL INDUSTRIES IN 2007

(Metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
BENIN				
Cement		Société des Ciments d'Onigbolo (Amida Group, 100%)	Onigbolo plant	450,000 cement; 500,000 clinker.
Do.		Ciments du Benin S.A. (Scancem International AS, 48.7%)	Cotonou plant	275,000 cement.
Do.		Société des Ciments du Benin (Government, 50%, and LaFarge Group, 50%)	do.	700,000 cement.
BURKINA FASO				
Gold	kilograms	Société des Mines de Taparko (High River Gold Mines Ltd., 90% and Government, 10%)	Taparko-Boroum Mine 200 kilometers from Ouagadougou	3,100.
Do.	do.	Cluff Gold plc, 78%; IMARB Indústria Metalúrgica, 12%; Government 10%	Kalsaka Mine (under development)	1,900.
Do.	do.	Etruscan Resources Inc., 90%, and Government, 10%	Youga Mine (under development)	2,700.
Do.	do.	Semafo Inc., 90% and Government, 10%	Mana Mine (under development)	3,900.
Manganese		Burkina Manganèse S.A.R.L.	Kiere Mine (under development)	NA.
Zinc		AIM Resources Ltd., 90%, and Government, 10%	Perkoa Mine (under development)	68,900.

Do., do. Ditto. NA Not available.