

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

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BENIN

Benin is a West African country bounded by Togo to the west, Burkina Faso and Niger to the north, Nigeria to the east, and the Bight of Benin to the south. The country's estimated 7.25 million inhabitants shared a total land area of 112,620 square kilometers (km²) (U.S. Central Intelligence Agency, 2005¹). In 2004, Benin's economy was primarily based on agriculture; cotton accounted for 80% of export earnings and about 40% of the gross domestic product (GDP) (U.S. Department of State, 2005a[§]). The mineral industry, which was limited to the production of cement, clay, gold, and sand and gravel, was not a significant component of Benin's economy. The GDP based on purchasing power parity was estimated to be \$7.92 billion in 2004 (International Monetary Fund, 2005[§]).

Government Policy and Legislation

The Ministère des Mines, de l'Énergie, et de l'Hydraulique was responsible for the administration of the mining sector. The Office Béninois de Recherches Géologiques et Minières was responsible for the administration of mineral development. The Benin Mining Code is regulated by Decree 89-296. Act No. 83-004 addresses fiscal policies that affect mineral development, and law No. 98-030 is responsible for national environmental responsibilities (Crankshaw, 2004).

In June 2004, Benin and China signed five agreements on economic and technological cooperation that included the granting of a preferential loan to Benin for the construction of a hydroelectric plant at the Adjarala dam project on the Mono River and the signing of a cooperation agreement between the China Council for the Promotion of International Trade and the Chamber of Commerce and Industry of Benin (Investir en Zone Franc, 2004[§]; People's Daily Online, 2004[§]).

In 2004, South Africa's Vice President visited Benin to follow up on an economic and political bilateral cooperation agreement that the two countries had signed in 2003. The areas of interest discussed were food processing, information and communication technology, tourism, transportation and infrastructure development, and the possibility of Benin supplying South Africa with agricultural products, cement, and cotton (afrolNews, 2004b[§]).

Trade

Benin's cotton exports and reexports to Niger and Nigeria accounted for about two-thirds of Benin's goods and services

exports. About 90% of Benin's trade passes through the Port of Cotonou. The country's principal trading partner was Nigeria. In 2004, Nigeria banned imports of Beninese reexports and tightened its border controls citing Benin's lack of concern for Nigeria's claims regarding gasoline smuggling and the flourishing trade in Nigerian stolen goods (Organisation for Economic Co-operation and Development, 2005[§]; UN Office for the Coordination of Humanitarian Affairs, 2004[§]).

Commodity Review

Metals

Gold.—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. Although gold had been mined in this region since colonial times, the Government did not become engaged in gold exploration until the 1960s. Exploration efforts were abandoned by the Government in the mid 1980s, but the land remained the property of the state. In 1993, artisanal miner migrants from Burkina Faso and Togo and villagers from northern Benin began recovering gold from abandoned Government exploration sites. The Government deployed the militia in 1996 to confiscate materials, mining equipment, and personal belongings from the miners and to force them out of the region. Militia efforts were not successful for long. The Government eventually implemented new policies that recognized this type of informal mining and delineated territories for small-scale mining, established cooperatives, and developed controls for gold trade (Grätz, 2003, p. 194-198). In 2004, gold exploration [no indication of whether it was by the Government or private companies] was concentrated around the Djougou/Aledjo-Koura and the Natitingou-Perma areas in northwestern Benin (Crankshaw, 2004).

Iron Ore.—Benin's iron ore resources, which are located at Loumbou-Loumbou and Madekali in the district of Borgou, were estimated to be as much as 500 million metric tons (Mt) at a grade of from 46% to 52% iron (Crankshaw, 2004). These resources remained undeveloped as of yearend 2004.

Industrial Minerals

Cement.—Cement was produced by Ciments du Benin S.A., Société des Ciments du Benin, and Société des Ciments d'Onigbolo. These companies had a combined cement production capacity of 925,000 metric tons per year (t/yr) (table 2).

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

Peat.—Peat deposits, which have been estimated to be more than 12 Mt, have been identified near Cotonou. Other peat deposits have been identified in the Tono Lake area east of Lokosso and at Kpakpatan in the Mono region (Crankshaw, 2004).

Phosphate Rock.—Phosphate deposits have been identified in northern and southern Benin. Past phosphate exploration, which was sponsored by the UN Development Programme, the UN Revolving Fund for Natural Resources Exploration, Benin's Direction des Mines de la Géologie et des Hydrocarbures, and the private sector, failed to identify resources that could be economical by large-scale mining methods (Crankshaw, 2004).

Mineral Fuels

Petroleum.—Benin began producing petroleum in 1982 from two wells in the Seme oilfield. During the 1980s, average petroleum production was about 8,000 barrels per day (bbl/d), but by 1996, production had tapered off to an average of 1,900 bbl/d (MBendi, 2005§). The oilfield was eventually shut down in 1998. Industrial Development Corporation Ltd. of South Africa was interested in reopening the Seme oilfield (African Energy, 2004).

Dallas, Texas-based Kerr-McGee LLC owned a 70% working interest in Block 4 offshore Benin. In 2004, the company was negotiating a farmout agreement with the Government to reduce its interest in the block to 40% (Kerr-McGee Corporation, 2005, p. 15; U.S. Securities and Exchange Commission, 2004, p. 16). The remaining 30% interest in the block was owned by Petrolia Nasional Bhd of Malaysia.

Infrastructure

In 2004, two infrastructure projects funded by the African Development Bank were underway. The projects included the \$22.45 million Djougou-Ndali interstate national road project, which will connect Benin, Nigeria, and Togo, and the \$18.31 million rural electrification project, which was part of Benin's electrification development program that has been extending electric power grids to towns and villages (afrolNews, 2004a§).

In November 2004, the World Bank approved \$125 million to support the construction of a 678-kilometer-long gas pipeline to transport natural gas from Nigeria to Benin, Ghana, and Togo. The gas will be used initially for power generation and later on for other industrial and commercial applications (World Bank, 2004§).

Outlook

Although Benin seems to be ready to participate in the global economy, the likelihood of foreign investment possibilities in the mineral sector may be hindered by Benin's smuggling problems and lack of security along its border with Nigeria. Iron ore and phosphate deposits may become more accessible and attractive to investors following recent infrastructure investments in the country's road and electrification systems. Once the construction of the West African Gas Pipeline is

finalized, the access to natural gas will also be of significance in the development of Benin's mineral resources.

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BURKINA FASO

Burkina Faso is a landlocked West African country bordered by Benin to the southeast, Côte d'Ivoire, Ghana, and Togo to the south, Mali to the north, and Niger to the northwest. The country's estimated 13.9 million inhabitants, as of 2004, share a land area of 274,200 km² (U.S. Central Intelligence Agency, 2005§). In 2004, Burkina Faso's GDP based on purchasing power parity was estimated to be about \$15.7 billion (International Monetary Fund, 2005§). Mining did not play a significant role in the country's economy. The principal mineral commodities produced were cement, dolomite, gold, granite, marble, phosphate rock, pumice and related volcanic materials, and salt. Alluvial mining has been estimated to provide a living

for as many as 50,000 families (Organisation for Economic Co-operation and Development, 2005, p. 124).

According to the Organisation for Economic Co-operation and Development (2004, p. 83-85), gold mining may help reduce the dependence on agriculture, and the price of gold and the reform of Burkina Faso's mining law may revive prospecting. Many of Burkina Faso's 170 existing exploration permits were granted in 2004 (Organisation for Economic Co-operation and Development, 2005, p. 123). The Canadian companies Axmin Inc., Channel Resources Ltd., Etruscan Resources Inc., Goldcrest Resources Ltd., High River Gold Mines Ltd., Jilbey Gold Exploration Ltd., Orezone Resources Inc., Riverstone Resources Inc., Semafo Inc., and St. Jude Resources Ltd. were actively exploring for gold. Also exploring for gold was Resolute Limited of Australia and Randgold Resources Ltd. and Ridge Mining plc (formerly Cluff Mining plc; name changed in May 2004) of the United Kingdom.

Government Policy and Legislation

Burkina Faso's mining law was revised in May 2003. Tax clauses, which included a reduced tax on mining company profits from 35% to 25% and reduced custom duties on machinery imports from 7.5% to 2.5%, had not been put into effect in 2004.

The privatization of Société Nationale d'Électricité du Burkina and Société Nationale Burkinabé d'Hydrocarbures was still underway (Organisation for Economic Co-operation and Development, 2005, p. 129-130).

Burkinabe Precious Metals Counter (CBMP), which was owned by the Government, was scheduled for privatization in 2004 (Organisation for Economic Co-operation and Development, 2005, p. 124). CBMP was a public entity in charge of production and the marketing of precious metals, supervising artisanal miners and small scale mines, buying gold from miners, and ensuring miner safety (Gueye, 2001, p. 6).

Commodity Review

Gold.—At least 10 Canadian companies, 2 United Kingdom companies, and 1 Australian company were exploring for gold in 2004. In May, Axmin completed a bankable feasibility study for the Bouroum permit; Axmin had previously purchased an 8% interest in the Bouroum permit from Channel Resources. Upon completion of the study, Axmin earned an additional 65% interest in the permit and announced its intention to acquire the remaining outstanding 27% (Mining Journal, 2004).

In June 2004, High River completed a feasibility study for the construction of a mine and mill to process ore from the Taparko-Boroum gold project. The Taparko-Boroum project is located about 200 kilometers (km) northeast of the country's capital of Ouagadougou. The Taparko exploitation license was acquired by High River in August 2004, and the Boroum license, in June 2004. The construction of the open pit mine and mill facilities was expected to be completed by the end of the first quarter of 2006 and to cost \$52 million. Mineral reserves were reported to be 7.6 Mt at a grade of 2.9 grams per metric ton (g/t) gold, or about 22,000 kilograms (kg) of contained gold. The average

annual gold production was expected to be about 2,800 kg; mine life was thought to be about 7½ years. Ore was to be mined from three open pit operations at Bouroum and three at Taparko. Ore from Bouroum will be trucked to Taparko for processing. The processing facilities at Taparko will include crushing, grinding, gravity concentration, and a carbon-in-leach plant. Electrical power will be provided by on-site diesel generators. High River owned a 90% interest in the Taparko-Boroum project, and the Government of Burkina Faso held the remaining 10% (African Mining, 2004b; High River Gold Mines Ltd., 2004).

In addition to the development of the Taparko Mine and mill, High River held exploration permits for three other areas—Area 8, which is located south of the Taparko-Boroum project; Gandi, which is located about 90 km southwest of the Taparko-Boroum project; and Labola, which is located in southwestern Burkina Faso. By yearend, exploration activities in Area 8 included a detailed induced polarization (IP)/resistivity survey, follow-up trenching, reconnaissance drilling, rock sampling, and soil geochemistry. The Gandi permit was still at an early stage of exploration. Soil geochemistry and geologic mapping were planned for 2005. At Labola, High River planned to conduct drilling, geologic mapping, and an IP/resistivity survey in 2005 (High River Gold Mines Ltd., 2004).

In February 2004, High River signed an agreement with Jilbey to form a strategic alliance in Burkina Faso. Under the agreement, Jilbey will act as High River's exploration arm in the country on an exclusive basis and will have defined rights to access the planned mill at Taparko. In addition, High River will have the right to acquire 50% of each of Jilbey's discoveries that prove economic within approximately 100 km of the planned Taparko facilities. Beyond these discoveries, Jilbey may develop the project on a 100% basis. In case Jilbey decides to have a partner to develop the property, the option should be given first to High River, which will then have 30 days to refuse it. Under the agreement, High River will also transfer all its existing exploration properties in the country with the exception of the Taparko-Boroum property to Jilbey (High River Gold Mines Ltd, 2004; Jilbey Gold Exploration Ltd., 2004c).

Jilbey was actively exploring in Burkina Faso. The company held several permits for potential gold targets, such as the Bissa Group permits, which hosted the Bissa Hill gold deposit; the Hounde Group permits; the Kindo Group permits; and the Taparko Group permits. In October 2004, Jilbey announced the results of the resource estimates for Bissa Hill, which were calculated by SRK Consulting of Australia. Measured and indicated resources at Bissa Hill were estimated to be about 1.4 Mt at a grade of 3.33 g/t gold, or about 4,580 kg of contained gold. Inferred resources were estimated to be 106,000 metric tons (t) at a grade of 2.89 g/t gold, or about 300 kg of contained gold (Jilbey Gold Exploration Ltd., 2004a, b).

Several mineralization zones have been identified within the areas of the Bissa Group permits for which geochemical testing, infill drilling, and prospecting were carried out during the year. In June, Jilbey signed an option with a local artisanal mining operator to earn a 100% interest in the Kindo Group permits. Sampling and trenching were carried out at Kindo during the year, and Jilbey was awaiting assessment results.

Work completed during 2004 at the Houde Group of permits consisted of prospecting and regional geochemistry. The company planned to conduct follow-up geochemical analysis, drilling, and trenching to test for identified anomalies in the area (Jilbey Gold Exploration Ltd., 2004b).

In January 2004, Etruscan completed the acquisition of the Youga gold deposits and acquired a 100% interest in three contiguous exploration permits. The Youga gold deposits were located in the Province of Boulgou about 180 km southeast of Ouagadougou and 4 km north of the Ghanaian border. The deposits are accessible by means of 70 km of paved highway and 120 km of dirt road. The geology of the Youga area is said to be similar to that of the Birimian gold belts of Ghana. The Youga exploitation permit includes the A2 East, the A2 Main, the A2 West 1, the A2 West 2, and the A2 West 3 deposits. Etruscan, through its wholly owned subsidiary Cayman Burkina Mines Ltd., held a 90% interest in Burkina Mining Company (the company that was granted the rights to mine the Youga gold deposits); the remaining 10% interest was held by the Burkinabe Government. Ashanti Goldfields Co. of Ghana, which was the company that had previously owned the deposits, had reported an indicated resource estimate of 9.1 Mt at a grade of 2.85 g/t gold, or about 25,900 kg contained gold, and an inferred resource of 2.88 Mt at a grade of 2.79 g/t gold, or about 8,000 kg of contained gold (Etruscan Resources Inc., 2004a). Etruscan contracted RSG Global of Australia to revise these estimates to be in compliance with National Instrument 43-101, which is a Canadian rule that governs how issuers disclose scientific and technical information about their mineral projects to the public (Association of Professional Geoscientists of Ontario, 2005§).

Etruscan awarded the drilling contract for the Youga deposits to Boart Longyear of Canada (Etruscan Resources Inc., 2004a). In June 2004, Etruscan announced that the diamond core drilling completed on the A2 West gold deposit confirmed high-grade gold mineralization, which included 8.95 g/t gold over 13.0 meters (m), 8.10 g/t gold over 12.2 m, and 6.06 g/t over 24.7 m. Etruscan held a total of 15 exploration permits in Burkina Faso (Etruscan Resources Inc., 2004b, c).

Goldcrest acquired Wentworth Resources Pty. Ltd. of Australia. Wentworth held the Kampti and the Malba concessions. The Kampti concession is located in the Province of Poni in southern Burkina Faso near the border with Côte d'Ivoire. The Malba concession is located near the town of Gaoua about 400 km southwest of Ouagadougou and about 40 km west of the border with Ghana. Goldcrest completed a reverse circulation drilling program that totaled 966 m in December 2004. Of the 11 holes drilled, 10 returned copper-gold mineralization (Goldcrest Resources Ltd., 2004a-c).

Orezone held 100% of the Essakan gold project, which is located about 330 km northeast of Ouagadougou. The project consists of six permits that covered an area of about 1,400 km². Orezone's joint-venture partner was Gold Fields Ltd. of South Africa, which had the option to acquire a 50% interest in the project by spending \$8 million on exploration within a 5-year period that began in 2002. Upon completion of a bankable feasibility study, Gold Fields had the option to increase its interest in the project to 70% if it funded 100% of mine

development costs. If a mine were developed at Essakan, then it would require additional infrastructure investments that would include power generation and a source of water. Access to the project was by paved and dirt roads (Orezone Resources Inc., 2005, p. 12).

Other properties owned by Orezone in Burkina Faso included Bombore, Bondi, Gueguere, Kerboule, and Sega. Bombore is located about 80 km north of Ouagadougou. Indicated resources were estimated to be about 14,600 kg of gold (reported as 471,000 troy ounces), and inferred resources, about 18,100 kg (reported as 582,000 troy ounces). Bondi is located about 250 km southwest of Ouagadougou. Indicated resources at Bondi were estimated to be about 1.76 Mt at a grade of 2.88 g/t gold, or about 5,000 kg of contained gold, and inferred resources, about 446,000 t at a grade of 2.41 g/t gold, or about 1,000 kg of contained gold. Gueguere is located about 240 km west of Ouagadougou; Kerboule is located about 250 km north of Ouagadougou near the border with Mali; and Sega is located about 200 km northwest of Ouagadougou. Inferred resources at Sega were estimated to be 3.3 Mt at a grade of 2.82 g/t gold. A \$2 million drilling program was underway in 2004 (Orezone Resources Inc., 2005, p. 13-15).

In 2004, Gold Fields switched its focus from exploring regional targets in Burkina Faso to concentrating on the Essakan Main Zone deposit (EMZ), which is located within the Essakan gold project. An extensive drilling program was carried out during the year at the EMZ with the purpose of defining an economic resource to be developed as a stand-alone mine. During the year, five reverse-circulation rigs and one core drill rig were operating at the EMZ. As a result of preliminary drilling, the company announced that the new indicated resource estimates were 49 Mt at a grade of 1.49 g/t gold and that the inferred resources were 5.7 Mt at a grade of 1.7 g/t gold based on a cutoff grade of 0.50 g/t. Gold Fields planned to update resource estimates once again in June 2005, begin a feasibility study in September 2005, and make a production decision by June 2006 (Orezone Resources Inc., 2005, p. 4).

In November 2004, Goldbelt Resources Ltd. of Canada entered into an agreement with Resolute to acquire Resolute's 100% interest in the Belahouro, the Diosso, the Kari, the Kiere, and the Mandiaso gold exploration properties (Goldbelt Resources Ltd., 2004).

Riverstone held the rights to the Rambo and the Solna properties. In November, the company entered into an option with Orex Resources S.A.R.L. to acquire an 80% interest in Orex's Liguidi Malguem property, which is a 225-km² area that is located about 125 km southeast of Ouagadougou. The Rambo property encompasses an area of about 150 km² in north-central Burkina Faso. During 2004, exploration activities included geochemical soil sampling, geologic sampling, and drilling. Riverstone acquired the Solna property in November 2004. The Solna property covers an area of 160 km² and is located in eastern Burkina Faso. The company planned to conduct geochemical rock and soil sampling and geologic mapping (Riverstone Resources Inc., 2004a-d).

In December 2004, Semafo was internally revising a feasibility study prepared by Managem S.A. of Morocco for the Mana gold project. The company owned a 100% interest in

the project. Semafo planned to obtain a mining permit and to create a local operating company. Once the company is created, the Burkinabe Government will be entitled to a 10% interest in it. The envisioned mine was expected to operate for 6 years and to produce about 3,000 kilograms per year (kg/yr) (reported as 100,000 troy ounces per year) during the first 2 years of operation and an average of 2,800 kg/yr for the remaining life of the mine (Semafo Inc., 2004; 2005, p. 8, 13).

St. Jude held a prospecting license for the Goulagou/Rounga project, which is located in the north-central region of Burkina Faso. The previous operator of the property was Channel Resources. On the basis of preliminary metallurgical tests on oxide samples, Channel had reported gold recoveries of up to 95% and had calculated inferred resources to be 24,000 kg (reported as 774,700 troy ounces). In 2004, St. Jude carried out definition drilling and performed metallurgical tests at the property and planned to conduct additional exploration drilling and follow-up in-fill drilling (St. Jude Resources Ltd., 2004, p. 2-3).

Manganese.—Manganese reserves at Burkina Faso's Tambao deposit, which is located to the northeast of the country, were estimated to be about 19 Mt of ore that averages 51.45% manganese. Operations at Tambao were suspended in 1998 owing to low manganese prices, which made the cost of moving the manganese ore about 250 km to the nearest railway and ocean ports uneconomic. The mine remained closed in 2004 (World Trade Organization, 2004\$).

Zinc.—On June 16, 2004, Aim Resources Ltd. (AIM) of Australia signed a memorandum of agreement with BHP Billiton and Metorex Ltd. of South Africa to acquire 100% of Metorex Burkina Faso BV (MBF). MBF (a subsidiary of Metorex) was the owner of the Perkoa zinc deposit, which is located about 125 km west of Ouagadougou. AIM was to pay Metorex \$1.1 million, 50% in cash and 50% in AIM shares. In 2004, about 23,000 m of drilling was completed in more than 74 diamond drill holes. Metorex had acquired 90% of the project in 2001; the remaining 10% was owned by the Government of Burkina Faso. In 2004, AIM hired Snowden Mining Industry Consultants of Australia to recalculate resources at the Perkoa zinc deposit. The recalculated inferred mineral resource at Perkoa was reported to be 7.06 Mt at grades of 17.7% zinc and 37.8 g/t silver (at a 10% zinc cutoff). The cost of developing a mine and concentrator at Perkoa was estimated to be between \$40 million and \$60 million (African Mining, 2004a, c; Aim Resources Ltd., 2004).

Infrastructure

The Government was trying to increase local energy production with the help of funding agencies. On November 30, 2004, the World Bank approved a \$63.58 million grant to help fund an electricity development plan for Bobo Dioulasso and Ouagadougou. The project included the construction of two powerplants with capacities of 14 megawatts (MW) and 7 MW in the Ouagadougou area. The country's total installed capacity was 172 MW (Organisation for Economic Co-operation and Development, 2005, p. 130).

The African Development Bank granted Burkina Faso \$5.4 million for a feasibility study to establish a rail line that will connect the country to Ghana. One of the uses of the rail line will be to export manganese ore (Sakyi-Addo, 2004\$).

Another ongoing project was the upgrading of about 1,000 km of roads in 13 Provinces around the country, which included the upgrading of 865 km of cotton farm track in the west and 110 km of track that serves the Provinces of Houet and Kadiogo (afrolNews, 2004\$).

Outlook

The growth potential of Burkina Faso's mining sector will depend on the success of ongoing gold exploration activities, the implementation of the new mining law, the successful development of the Perkoa zinc deposit, the increase in electricity capacity, and the update of the country's basic infrastructure.

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SAO TOME E PRINCIPE

The Democratic Republic of Sao Tome e Principe consists of the islands of São Tomé and Príncipe and several islets in the Gulf of Guinea. The islands of São Tomé and Príncipe are located in the equatorial Atlantic about 300 and 250 km, respectively, off the northwestern coast of Gabon. The country's estimated 182,000 inhabitants, as of 2004, share a total land area of 1,001 km² (U.S. Central Intelligence Agency, 2005§). The GDP based on purchasing power parity was estimated to be about \$245 million in 2004 (International Monetary Fund, 2005§). The country was mostly dependent on the production of cocoa, which accounted for about 95% of exports (U.S. Department of State, 2005§).

Potential exists for the development of the country's petroleum industry. In 1999, the Governments of Nigeria and Sao Tome e Principe began negotiations on the territorial claims of an overlapping maritime boundary area within the

two countries' exclusive economic zones. An agreement for joint development of the resources within the area was reached in 2001. The affairs of the joint development zone (JDZ), as the area was known, were managed by the Joint Development Authority (JDA), which was created in January 2002. The JDA reports to a Joint Ministerial Council (JMC), which has the responsibility for all matters that concern the exploration for and mining of the resources in the JDZ. Under the agreement, Nigeria will have the right to 60% of all revenues from oil and gas exploration and production, and Sao Tome e Principe will have the remaining 40%. In 2004, Government initiatives to develop the petroleum industry included the creation of a new law that established an oil fund which will be managed by an international custodial bank. All oil payments are to be made directly into the fund. The law also created a public oversight commission, requires competitive tenders for oil contracts, makes oil contracts public, and mandates the inclusion of anticorruption and transparency provisions (Bell, 2005).

In April 2003, the JDZ was divided into nine blocks, and a licensing round was opened for bids. In April 2004, a production-sharing contract (PSC) for Block 1 was awarded to a consortium lead by Chevron Texaco JDZ Ltd. (51%) (a subsidiary of ChevronTexaco Corporation of United States); the other coinvestors in the block were Esso Exploration and Production Nigeria-São Tomé "One" Ltd. (40%) and Dangote Energy Equity Resources Ltd. (9%), which was a joint venture between the Dangote Group of Nigeria and Energy Equity Resources AS of Norway. ChevronTexaco will be the operator of the block. The consortium paid a signature bonus of \$123 million for exploration rights. As of December 2004, the consortium continued to negotiate the terms of the PSC with the JDA. Drilling was scheduled to begin during the first half of 2005. Block 1 was the only block awarded during the round (ChevronTexaco Corporation, 2005; UN Office for the Coordination of Humanitarian Affairs, 2004§; Nigeria-São Tomé and Príncipe Joint Development Authority, 2005§; U.S. Department of State, 2005§).

A second round in which five blocks were offered opened in November 2004. Among the 23 companies that participated in the second round were Devon Energy Corporation, Environmental Remediation Holding Corporation, and Pioneer Resources Africa Limited (afrolNews, 2004§; Rigzone.com, 2004§). Petroleum reserves in the JDZ have been estimated to be about 6 billion barrels (Schlumberger, 2004§).

The U.S. Trade and Development Agency awarded two grants to Sao Tome e Principe's Ministry of Public Works in 2004. The first grant, which was in the amount of \$450,000, will fund a feasibility study for the construction of a deepwater port in Sao Tome, and the second grant, which was in the amount of \$350,000, will fund technical assistance for Sao Tome's airport expansion (U.S. Trade and Development Agency, 2004§).

Outlook

Sao Tome e Principe's economy will likely be dominated by the petroleum sector in the long run if commercial quantities of petroleum are discovered within the country's territorial waters in the Gulf of Guinea. Growth in the sector, however, will

depend on the successful development of any such discoveries, ongoing offshore exploration activities, and the Government's interest in continuing to adopt measures to establish new standards that will help manage its petroleum resources. The recent enactment of an oil revenue law suggests that the Government is interested in moving forward with its policy to develop the country's hydrocarbon resources.

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TABLE 1
BENIN AND BURKINA FASO: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Country and commodity	2000	2001	2002	2003	2004
BENIN					
Cement, hydraulic	250,000	250,000	250,000	250,000	250,000
Clay	--	17,716	19,000 ^e	21,000	21,000
Gold kilograms	--	16	20	20	20
Gravel cubic meters	33,027	24,675	26,000 ^e	28,500	29,000
BURKINA FASO ²					
Cement	100,000	50,000	30,000 ^e	30,000	30,000
Dolomite cubic meters	NA	3,000	3,000	3,000	3,000
Gold kilograms	625 ^r	229 ^r	209 ^r	770 ^r	1,125 ³
Granite cubic meters	NA	280,000	300,000	300,000	300,000
Phosphate rock:					
Gross weight	NA	1,010	2,350	2,400	2,400
P ₂ O ₅ content	NA	280	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. NA Not available. ^rRevised. -- Zero.

¹Table includes data available through July 8, 2005.

²In addition to the commodities listed, sand and gravel and other construction materials are produced, but information is inadequate to make reliable estimates of output levels.

³Reported figure.

TABLE 2
BENIN: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
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 of Norway, 48.7%)	Cotonou plant	275,000 cement.
Do.	Société des Ciments du Benin (Government, 50%, and private, 50%)	do.	200,000 cement.