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SIERRA LEONE

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The Mineral Industry of Sierra Leone

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The Republic of Sierra Leone, which is located in West Africa, is bordered by the Atlantic Ocean to the west, Guinea to the north and northeast, and Liberia to the southeast. In 2005, the population was estimated to be about 6 million and was growing at an estimated rate of about 2.22%. The country's total land area is 71,620 square kilometers (km^2) (U.S. Central Intelligence Agency, 2005§[1]). The country's estimated gross domestic product (GDP) based on purchasing power parity was about $4.9 billion in 2005; the per capita GDP based on purchasing power parity was about $903 (International Monetary Fund, 2006§). Mineral commodities produced in Sierra Leone included cement, diamond, and gold.

According to the Central Bank of Sierra Leone, the mining sector, which was dominated by diamond mining, was the main source of foreign exchange to the economy (Bank of Sierra Leone, 2006, p. 3). About 90% of diamond exports was produced by artisanal miners. Most of the country's diamond was exported to Belgium, the United Kingdom, and the United Sates (The Diamonds and Human Security Project, 2005).

Government Policies and Legislation

Mining in Sierra Leone was regulated by the Mines and Minerals Amendment Act of 1994 and by the Mines and Mineral Amendment Act of 2003. The Petroleum Act of 2001 regulated petroleum activities. In 2003, a new "Core Mineral Policy" that was designed to revive the mining sector was established by the Ministry of Mineral Resources (MMR). The MMR was responsible for the administration of the mineral industry, the issuance of mining licenses, field monitoring, enforcement, and the maintenance of mining records. The Gold and Diamond Department of the National Revenue Authority was responsible for implementing Sierra Leone's participation in and compliance with the international diamond trade control requirements of the Kimberley Process Certification Scheme (Coakley, 2004, p. 34.1; Sierra Leone Ministry of Mineral Resources, 2006§).

The MMR established the Diamond Area Development Fund (DACDF) in an effort to stop illegal diamond mining activities and smuggling. Through the DACDF, a mining community will have the opportunity to obtain a small percentage of diamond export taxes, a portion of which is to be disbursed to the chiefdom of each community. The Government believed this system will provide an incentive for communities to combat illegal mining activities (The Diamonds and Human Security Project, 2006).

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

Environment

An estimated 800 to 1,200 km^2 (reported as 80,000 to 120,000 hectares) of land has been mined out in Sierra Leone and almost no effort has been made toward reclamation. Artisanal mining is largely unregulated and, according to Partnership Africa Canada, diamond mining practices have, over time, led to massive deforestation, health problems, and loss of biodiversity. The Government requires a fee of only $50 from mining license holders for environmental rehabilitation and, although the Core Mineral Policy states that artisanal mining plots should not exceed 176 square meters (m^2) (reported as 210 square yards), some mines often comprise several plots that cover areas as large as about 100,000 m^2 (reported as 25 acres) (The Diamonds and Human Security Project, 2005).

An environmental impact assessment carried out in 2003 for Koidu Holdings Limited (KHL), which was the only kimberlite mining operation in the country, established that residents living in the vicinity of the company's mining operations could be adversely affected by blasting. The results of the study called for the relocation of about 4,500 residents. A dispute between the residents and KHL concerning property rights was resolved in May 2005 when an agreement was reached under which new houses were to be constructed by community residents, and KHL was to bear the cost of construction materials, labor, and supervision (The Diamonds and Human Security Project, 2005; 2006).

Trade

Mineral exports, which accounted for about 90% of Sierra Leone's total export earnings, increased by about 12.6% to nearly $142.5 million in 2005; 99.8% of these earnings was from diamond exports (Bank of Sierra Leone, 2006, p. 21). Most diamond exporters in Sierra Leone were said to be foreign nationals of Lebanese descent, many of whom fund artisanal miners and diamond dealers in the country (The Diamonds and Human Security Project, 2005). Partnership Africa Canada reported that the value of official exports could be much higher were it not for smuggling; about 50% of production was thought to be smuggled out of the country (The Diamonds and Human Security Project, 2005).

According to U.S. Census Bureau foreign trade statistics, Sierra Leone's exports to the United States were valued at about $9.4 million in 2005 compared with about $10.9 million in 2004 and $6.5 million in 2003; $5.1 million of these exports was from gem-quality diamond and $1.1 million, from bauxite and aluminum (U.S. Census Bureau, 2006b§). Imports from the United States were valued at about $37.8 million in 2005 compared with about $40.6 million in 2004 and $28.2 million in 2003. These included nearly $2.8 million for excavating machinery and $453,000 for drilling and oilfield equipment (U.S. Census Bureau, 2006a§).

Commodity Review

Metals

Bauxite and Alumina.—Argyll Resources Corporation of the United Kingdom signed a memorandum of understanding with the Government to restart bauxite mining in the Kambia District. The company was to invest $1.6 billion to mine bauxite and build a 1.4- to 1.5-million-metric-ton-per-year (Mt/yr) alumina plant (Metal Bulletin, 2005; Bank of Sierra Leone, 2006, p. 3; Angola Press, 2005§).

On January 20, 2005, Moydow Mines International Inc. of Canada announced that it had signed an agreement with Gondwana Investments S.A. (a Luxemburg-based company) to acquire a majority interest in the Porto Loko bauxite deposit in Sierra Leone. Moydow had the option to acquire an initial 49% interest in Porto Loko by investing $600,000 in exploration and could acquire up to 60% interest in the project either by investing an additional $400,000 on exploration or by conducting a feasibility study. According to Moydow, previous exploration on the property had outlined a resource of about 100 Mt of bauxite at an average grade of 47% Al_2O_3. In addition, Moydow was to grant Gondwana 150,000 shares and 200,000 options for a period of 2 years (Moydow Mines International Inc., 2005; 2006§).

Sierra Mineral Holdings I Ltd. (SMHL) (a subsidiary of Titanium Resources Group Ltd.) held a bauxite mining license for a 580-km^2 area in southwestern Sierra Leone that was located about 150 kilometers (km) southeast of Freetown. The mining license, which was for a period of 10 years, included the restarting of bauxite mining operations and the refurbishment of existing infrastructure at Gondama and at the Nitti Port facilities. In 2005, SMHL announced that the refurbishment program was underway and that the company had entered into a long-term sales agreement with Alcoa World Alumina LLC of the United States and Glencore AG (a subsidiary of Glencore International AG) of Switzerland to sell the project's full annual production, which was estimated to be 1.2 Mt/yr of bauxite. Production was expected to begin during the first quarter of 2006. The mined bauxite would be processed locally and then loaded onto 2,000-metric-ton (t)-capacity barges and moved down the Sherbro River to the Atlantic Ocean for shipping (Mining Journal, 2005; Titanium Resources Group Ltd., 2005a; Australia's Paydirt, 2006).

Gold.—Mano River Resources Inc. of the United Kingdom in joint venture with Golden Star Resources Ltd. of the United States continued to explore for gold at the Nimini, the Pampana, and the Sonfon properties. Between October 2004 and May 2005, nearly 5,300 soil samples were collected from within all three properties to conduct a soil geochemistry survey. On November 18, 2005, following the completion of the survey, Mano River announced two new gold discoveries—one at the Pampana property, which is located about 150 km east of Freetown, and the other at the Sonfon property, which is located about 175 km northeast of Freetown. Followup drilling at both properties was scheduled to begin during the third quarter of 2006. The initial phase of the project was to be funded by Golden Star at a cost of $750,000 (Mano River Resources Inc., 2006, p. 5).

In October, Cluff Gold plc announced the completion of its 4,600-meter drilling program at the Baomahun gold prospect. The Baomahun gold prospect is located in Sierra Leone's Southern Province about 180 km east of Freetown. Cluff reported a resource estimate of 4.54 Mt of ore at an average grade of about 3.6 grams per metric ton (g/t) gold. Cluff Gold UK Limited (a subsidiary of Cluff Gold plc) could earn a 60% interest in the Baomahun project from Winston Mines Ltd. by spending $5 million or by completing a bankable feasibility study (Cluff Gold plc, 2005a, b; 2006, p. 4).

Titanium.—Before the start of the civil war, which led to the closing of the Sierra Rutile Mine in 1995, Sierra Leone was one of the world's leading producers of ilmenite and rutile. In early 2005, Sierra Rutile Limited (SRL) (a company owned by Titanium Fields Resources Limited and U.S. Titanium LLC) began the refurbishment of Dredge DI and of the associated infrastructure of the Sierra Rutile Mine, which was scheduled to be reopened in 2006. Dredge DI was expected to produce about 100,000 t/yr of rutile during the first phase of operation and to increase production to about 200,000 t/yr of rutile during the second phase. SRL planned to produce standard-grade rutile, which would be destined mainly for consumption in the manufacturing of titanium dioxide pigments and titanium sponge, and industrial grade rutile, which would be destined mainly for the welding rod, thermal insulation, and ceramics markets. The company announced that it had signed sales contracts (buyers names not disclosed) for more than one-half of SRL's future production (Titanium Resources Group Ltd., 2005b; 2006, p. 5).

In December 2005, Titanium Resources Group Ltd. signed an $120,000 agreement with Gondwana to acquire the Rotifunk mineral sands prospect, which is located about 65 km southeast of Freetown and 40 km northwest of the Sierra Rutile Mine. Titanium Resources reported that previous exploration at the prospect, which was undertaken during 2003 and 2004 by Gondwana, had outlined inferred mineral resources of about 170 Mt that contained 0.84% ilmenite, 0.70% rutile, and 0.06% zircon. Titanium Resources planned to evaluate the potential of the Rotifunk prospect further in 2006 (Titanium Resources Group Ltd., 2005c).

Industrial Minerals

Cement.—Cement production decreased to 172,130 t from a revised 180,460 t in 2004 owing to a breakdown at the Sierra Leone Cement Corporation Ltd. (SLCC) production plant in Freetown in March 2005. According to the Central Bank of Sierra Leone, the domestic demand for cement increased markedly during the first half of 2005. To meet such demand, SLCC had to import about 14,300 t of cement during the year. The company installed a new production cement plant in August 2005 (Bank of Sierra Leone, 2006, p. 6).

Diamond.—Diamond production decreased by about 3.5% to 668,710 carats in 2005 from 693,104 carats produced in 2004; 393,790 carats were gem quality (Bank of Sierra Leone, 2006, p. 7-8). As of the end of 2005, about 2,400 diamond mining licenses had been issued in the country. Most diamond production came from alluvial deposits; mining from kimberlite pipes began in 2003. As of 2005, only Koidu Holdings S.A. (KHSA) was engaged in kimberlite mining. The Government's revenues from the diamond sector came from license fees, a corporate tax on KHSA, and export taxes (The Diamonds and Human Security Project, 2006).

In 2005, the number of artisanal miners in Sierra Leone was estimated to be more than 100,000; about 70% of artisanal diamond production came from the Kono District. The first diamond mining license in the Northern Province was issued in 2002; by 2004, diamond mining was reported in four of the Northern Province's five districts where kimberlite dykes were believed to exist. Sierra Leone Diamond Company Ltd. (SLDC) was conducting prospecting work in the Kamakwie area to assess the viability of such dykes. Overcrowding of the mining areas in the north by artisanal miners reportedly had caused a series of social and health problems, including outbreaks of cholera and other diseases, environmental degradation, diamond smuggling across the Guinean border, and the abandonment of agricultural activities for diamond mining (The Diamonds and Human Security Project, 2005).

SLDC had a number of subsidiaries that held prospecting and exploration licenses in Sierra Leone; these included Fatkad Mining Company Limited, Kangaroo Mining Company Limited, and Molans Mining Company Limited. SLDC held several exploration and prospecting licenses in Sierra Leone, the primary target of which were diamond-bearing kimberlite pipes and, secondarily, alluvial diamond, bauxite, gold, iron ore, rutile, and rare-earth minerals. The company's main exploration areas were Kamakwie, Kono, and Sewa River. Exploration blocks within these areas included the Coastal Block, the Gori Hills Block, the Northeast Block, the Northwest Block, and the Sewa River Block. In 2005, the company completed high-resolution aeromagnetic surveys at each of these areas. A total of 146 targets in the Northwest Block, 24 in the Sewa River Block, and 16 in the vicinity of the Marampa and the Tonkolili iron ore deposits were identified and scheduled for followup soil sampling and ground magnetometry. Drilling and bulk sampling for some of the targets was scheduled for 2006. In June 2005, the Government awarded SLDC an exclusive prospecting license for bauxite, diamond, gold, iron ore and rutile in the North Sula Tonkolili District and the Jambohun area and an exploration license in the Baoma District (Sierra Leone Diamond Company Limited, 2006, p. 6-10; The Diamonds and Human Security Project, 2006).

KHSA was a joint venture of Energem Resources Inc. (40%), Magma Diamond Resources Ltd. (35%), and the privately owned Geneva-based Beny Steinmetz Group (25%). The joint venture mined two kimberlite pipes in Koidu. In addition to the kimberlite pipes, KHSA was exploring three other properties, namely, the Matemu, the Middle and the Upper Sewa, and the Tongo Fields kimberlite dyke deposit. On May 24, the company announced the completion of a delineation drilling program for pipes 1 and 2, the updating of a three-dimensional (3-D) geologic model, and the completion of a bulk sampling trial mining program at Koidu. During the bulk sampling program, a total of 76,619 t of ore was mined from pipe 1 and yielded 34,679 carats, which was sold at an average price of $231 per carat; 200,214 t of ore was mined from pipe 2 and yielded 50,964 carats, which was sold at an average price of $187 per carat; 3,532 carats was produced from other sources, such as dykes and ramp areas, and sold at an average price of $169 per carat in addition to 11,604 carats of industrial-quality diamond, which was sold at an average price of $4 per carat. A technical report to update resource estimates at KHSA's properties in Sierra Leone was prepared by Venmyn Rand (Pty) Ltd. in 2005. Indicated and inferred resources for pipe 1 were estimated to be about 1.52 Mt of ore at an average grade of 0.55 carat per ton, or about 834,000 carats of diamond; indicated and inferred resources at pipe 2 were estimated to be about 2.9 Mt of ore at an average grade of 0.26 carat per ton, or about 760,000 carats of diamond; indicated resources at Dyke Zone A were estimated to be 455,000 t of ore at an average grade of 0.54 carat per ton, or about 246,000 carats of diamond, and indicated resources at Dyke Zone A Enlargement were estimated to be 82,000 t of ore at an average grade of 0.75 carat per ton, or about 61,500 carats of diamond. The preliminary estimates for the life of the mine of pipes 1 and 2 was 7 years (Energem Resources Inc. 2005; 2006§).

In January 2004, Mano River was awarded a 9,700-km^2 regional exclusive prospecting license in southeastern Sierra Leone and, in May, the company signed a joint-venture agreement with BHP Billiton (BHP) of Australia under which BHP could earn a 51% interest in the property by investing $3.4 million in exploration during a 3-year period. BHP could obtain up to a 71% interest by funding a feasibility study on potential kimberlite areas. By the end of March 2005, more than 800 heavy-mineral stream samples had been collected and sent to South Africa for analysis. Initial results yielded several kimberlitic mineral anomalies in the area, one of which included chromite, garnet, and ilmenite. In September, Mano River completed soil sampling and ground magnetic surveys of the anomaly but announced the suspension of fieldwork at the property owing to the advent of the rainy season (Mano River Resources Inc., 2004; 2005b, c).

Mano River (49%) also explored for diamond in joint venture with Petra Diamonds Limited (Petra), a South African-based company (51%) at the Lion dykes, which are located about 340 km east of Freetown in the Kono District. Petra completed the manufacturing of a 75-metric-ton-per-hour dense-media-separation and crushing plant in South Africa, which was to be shipped to Sierra Leone and commissioned during the first quarter of 2006 (Mano River Resources Inc., 2005a; Petra Diamonds Limited, 2006, p. 3, 16-17). Other companies that explored for diamond in Sierra Leone in 2005 included African Diamonds plc, Cream Minerals Ltd., and River Diamonds plc.

Mineral Fuels

Petroleum.—Sierra Leone did not produce or refine petroleum and was dependent upon imports for its petroleum requirements. Through an international tender held in 2003, the Government awarded Repsol YPF S.A. of Spain in joint venture with Woodside Petroleum Ltd. of Australia exploration licenses for offshore Blocks SL-6 and SL-7. In January 2005, Blocks LB-16 and LB-17 were also awarded to Repsol (Petroleum Economist, 2005).

Infrastructure

In 2005, production of electricity decreased by 37.22% to 53.25 gigawatts per hour (GW/hr) from 84.82 Gw/hr produced in 2004. The Government attributed the decrease to the continuous breakdown of old generator plants. In February 2005, the European Union provided about $2.7 million to assist the National Power Authority and, in August, the Government signed an $8 million loan agreement with the Arab Bank for Economic Development in Africa (BADEA) for Phase I of the Western Area Power Generation Project (WAPGP). The purpose of the WAPGP project was to build thermal plants that would add 50 megawatts (MW) to supplement the Bumbuna Hydro Electric Power Project (BHEPP). The $8 million loan was for the construction of a 7.5-MW subpower station at Blackhall Road that would supply electricity to eastern Freetown. The BHEPP was jointly funded by the African Development Bank, the International Development Association, the Italian Government, the Netherlands Clean Development Facilities, and the Organization of Petroleum Exporting Countries. A contract was signed with Salini Construttori Company for the completion of the BHEPP by 2007. In 2005, the Government also received a 7-MW diesel generator from the South African Government to increase electricity supply in Freetown; the generator was expected to be operational by 2006 (Bank of Sierra Leone, 2006, p. 3-4, 8-9; Republic of Sierra Leone, 2005§).

BADEA will also help finance the reconstruction of the Kenema-Koindu road in 2006 upon completion of a feasibility study. According to the Government, the Kenema-Koindu road was the route used by rebels to enter Sierra Leone from Liberia during the war and is of great economic importance to Sierra Leone given that it is also the transit corridor for cocoa and coffee crops and for some of the diamond fields (Republic of Sierra Leone, 2005§).

Reconstruction work on damaged public and private buildings and roads continued in 2005. The number of building permits issued throughout the year increased to 667 from 422 in 2004. Residential permits issued increased by 48.6% to 520, and commercial permits issued increased to 55 from 9 issued in 2004 (Bank of Sierra Leone, 2006, p. 9).

Outlook

The establishment of peace after more than 10 years of civil war; reconstruction efforts, which included the rehabilitation of buildings and roads; investments to increase electricity production capacity; the implementation of the Kimberley Process; the establishment of sanctions on Liberia, which was considered one of Sierra Leone's major diamond-smuggling routes; plans to restart bauxite and rutile mining; the beginning of mining from kimberlite pipes; and the presence of several foreign companies exploring for gold in the country in 2005 all seem to indicate that not only is the Government taking steps to revamp Sierra Leone's mineral industry, but that foreign companies seem to have developed confidence in the country's ability to do so. In the short run, Sierra Leone's economy is likely to continue to depend greatly on revenues from the diamond industry although, in the longer run, rutile production, which was Sierra Leone's top export commodity during the early 1990s, could also contribute significantly to future earnings. Political stability and the Government's commitment to promote foreign direct investment, however, is of utmost importance for the industry to develop. Parliamentary and Presidential elections are to be held in July 2007.

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TABLE 1
SIERRA LEONE: PRODUCTION OF MINERAL COMMODITIES[1]

Commodity		2001	2002	2003	2004	2005
Cement	metric tons	113,268	144,145	169,109	180,460 r	172,130
Diamond	carats	222,520 [2]	351,860 [2]	506,819 [2]	693,104 r	668,710
Gold	kilograms	--	--	--	27 r	53
Gypsum[e]	metric tons	4,000	4,000	4,000	-- r, 3	-- [3]
Salt	do.	2,889	1,821	1,005	827	--

[e]Estimated; estimated data are rounded to no more than three significant digits. [r]Revised. -- Zero.
[1]Table includes data available through November 8, 2006.
[2]Exports.
[3]Reported figure.

TABLE 2
SIERRA LEONE: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies	Location of main facilities	Annual capacity
Bauxite[1]		Sierra Mineral Holdings I Ltd. (Titanium Resources Group Ltd.)	Mokanji Mine (scheduled to reopen in 2006)	1,200
Cement		Sierra Leone Cement Corp. Ltd.	Freetown plant	NA
Diamond	carats	Koidu Holdings S.A. (Energem Resources Inc. 40%, and BSG Resources Ltd., 25%)	Two kimberlite pipes, Koidu	120
Titanium, rutile concentrate[1]		Sierra Rutile Ltd. (Titanium Field Resources Ltd. and U.S. Titanium, LLC)	Sierra Rutile Mine (to reopen in 2006)	200

NA Not available.
[1]Not operating in 2005.