

# THE MINERAL INDUSTRY OF CONGO (KINSHASA)

By George J. Coakley

The Democratic Republic of the Congo [Congo (Kinshasa)] is located in the heart of equatorial central Africa and has an area of 2,267,600 square kilometers (km<sup>2</sup>), which is about one-quarter that of the United States. The area supported a population of more than 50 million in 1998 with a gross domestic product (GDP) per capita of \$710 based on 1998 purchasing power parity data. Disruptions caused by civil wars in 1997 and 1998 and the uncertain investment policies of the new Government were a setback to the proposed new mineral development needed to revitalize the mineral economy of Congo (Kinshasa). Historically, the mining industry accounted for 25% of the GDP and about three-quarters of total export revenues. The near collapse of the economy, however, has made it difficult to sustain normal mining activities, and most foreign exploration activity came to halt by the end of 1998 following the outbreak of a new full-scale civil war in August 1998.

The state-owned La Générale des Carrières et des Mines (Gécamines), formerly the nation's major foreign currency export earner, continued its struggle to maintain copper production at 5% to 10% of capacity. The deterioration of the overall economy and the lack of reinvestment of Gécamines revenues in routine maintenance and capital development have contributed to this decline in the industrial mainstay of the economy.

## Government Policies and Programs

Legislation has been passed relating to all aspects of the mineral industry. Article 10 of the Constitution states that the soil and subsoil belong to the state. Prospecting, exploration, and exploitation are regulated by Ordinance No. 81-013 of April 2, 1981, and required permits from the Ministry of Mines. During 1996 and 1997, the Government was successful in attracting a number of new foreign investors, particularly Canadian junior mining and exploration companies, for new grassroots exploration and joint ventures with Gécamines on the rehabilitation of known copper-cobalt, gold, manganese, and zinc mining properties. Parastatal operations targeted for privatization or joint-venture redevelopment included more than 20 copper-cobalt and zinc mines and processing facilities owned by Gécamines, the gold-tin producer Société Minière et Industrielle du Kivu (SOMINKI), the major diamond producer Société Minière de Bakwanga (MIBA), and the major gold producer Office des Mines d'Or de Kilo-Moto (Okimo). In 1997, more than 100 preliminary agreements for exclusive exploration zones ["zones exclusives de recherche" (ZER)] were been signed, and another 200 were pending. The projects held the potential for between \$2 billion and \$3 billion in new

investments needed to revitalize the Congolese mining industry. Uncertainty, however, was raised among the international mining and financial communities in late 1997 and January 1998, when the new Government canceled or questioned the legality of a number of exploration and mining agreements. Claiming that the companies "had been dragging their feet instead of starting work," the Government canceled mining exploration agreements with 12 companies (Metal Bulletin, 1998a; Business Day Online, January 27, 1998, Congo scraps 12 mining research deals, accessed January 27, 1998, at URL <http://www.bday.co.za/98/0127/news/n14.htm>). The Government also questioned the validity of agreements held by American Mineral Fields, Inc. (AMF), on its Kolwezi copper-cobalt tailings project and Ashanti Goldfields Company Ltd. of Ghana on the Okimo gold mine. During 1997, the new Government canceled a diamond marketing agreement between MIBA and De Beers Centenary AG and the management contract for the South African company operating Sizarail, the State-owned railroad.

## Production and Trade

As estimated in table 1, production of most commodities, with the exception of refined cobalt, remained in decline during 1998. Diamond production estimates were more than 30% lower than those of 1997, but exact figures are uncertain owing to the high level of smuggling and undocumented artisanal production. The movement of illegally mined diamonds from Angola through Congo (Kinshasa) and other nearby countries to world markets adds to the difficulty in estimating real domestic production. Crude petroleum production remained constant at about 29,000 barrels per day (bbl/d). The more significant mineral commodities exported were, in order of value, diamond, cobalt, copper, crude oil, and gold. Historically, the main trading partners of Congo (Kinshasa) were Belgium, France, Germany, Japan, South Africa, and the United States. A program begun by Gécamines in 1994 to focus on high-unit-value cobalt production continued to give some returns as refined cobalt production increased by 60% to 4,490 metric tons (t) compared with that of 1997; production was valued at nearly \$223 million on the basis of the average market price for 1998. With the virtual collapse of the metal mining sector, diamond exports, chiefly from the Kasai Provinces, became the most important source of foreign exchange derived from the mineral sector. Trade data for 1997 (the latest available) indicated that officially exported diamonds accounted for \$717 million out of a total value of all goods exported of \$1.396 billion.

## Structure of the Mineral Industry

The Government maintained at least part ownership and generally majority ownership of nearly all the productive and service sectors of the economy. Gécamines produced essentially all the coal, cobalt, and copper either on its own account or with joint-venture partners. Gécamines also operated subsidiaries that produced cement and other materials required for its primary mineral interests. MIBA produced about 25% of industrial diamond production with the remainder coming from small artisanal operators. Components of Gécamines, Okimo, and SOMINKI were being offered for privatization or joint-venture operations with foreign partners.

## Commodity Review

### Metals

**Copper and Cobalt.**—Gécamines holdings in the Copperbelt in Shaba Province contained one of the greatest concentrations of high-grade copper and coproduct cobalt resources in the world. Since 1993, most mining operations have come to a standstill with total capacity utilization at less than 10% since then. Gécamines faced multiple crises in finance, production, and transportation. The company's poor condition was attributed to a combination of aging equipment; lack of domestic and international investment; lack of spare parts; shortages of fuel, lubricants, and sulfuric acid; problems with transporting ore and finished products; theft of finished products; debts owed to the state electrical company and Sizarail; flooding of open pit mines; and the inability to retain professional and other personnel because of disruptions caused by tribal conflicts and other factors.

To attract the capital needed to revitalize operations, Gécamines was using joint ventures with foreign investors and retaining up to 49% equity interest in these joint-venture arrangements, most of which ranged from 20% to 45%. In addition to treating stockpiled cobalt hydrates, Gécamines planned to start up production at three small-scale cobaltiferous mines at Kababankola, Kasombo, and Twilezembe and to rehabilitate metallurgical facilities at Kamoto and elsewhere. By the beginning of 1998, Gécamines had 23 cooperative projects, including development of the Tenke-Fungurume deposits, that it hoped would return production levels of copper to 400,000 t and cobalt to 25,000 t by 2000 (Swana, 1998); however, the outbreak of a new civil war has put the future of many of these projects in question.

In 1998, Gécamines entered into an agreement with OM Group, Inc. (OMG) of the United States, one of world's largest consumers of refined cobalt, and l'Enterprise Generale Malta Forrest SPRL (EGMF) to begin treating tailings from the Luiswishi copper-cobalt mine, which had been closed since 1962. Concentrates produced were shipped to the OMG Kokkola Chemical Plant in Finland. The Luiswishi project, which reopened in November 1997, was scheduled to produce 13,300 metric tons per year (t/yr) of copper and 2,800 t/yr of cobalt during a 13- to 15-year life of operations (Business Day Online, [November 11, 1997], Forrest reopens Luiswishi mine,

accessed November 12, 1997, at URL <http://www.bday.co.za/97/1111/world/w17.htm>). OMG and EGMF continued construction work on a 5,000-t/yr cobalt smelter in Lubumbashi to produce cobalt-copper alloys from concentrate converter slags. The \$18 million slag treatment plant was scheduled to be completed by 2000 by Outokumpu Oy of Finland. The alloy product will be sent to the Kokkola refinery for final processing (OM Group, Inc., 1999; OM Group, Inc., June 25, 1997, OM Group signs cooperation agreement to build smelter in Congo, press release, accessed July 8, 1997, at URL <http://www.omgi.com/pressrelease/062597.htm>).

In other cobalt-related developments, EGMF also operated the Kasomba 2 joint-venture project with Gécamines and Union Minière of Belgium (Mabiola, 1999). Ridgepointe Overseas Developments Ltd. of the British Virgin Islands produced cobalt from the Kababankola Mine near Likasi (Block, 1998). KGHM Polska Miedz, S.A., the Polish state-owned copper company, continued its operations at the Kimbe deposit (Metal Bulletin, 1998b).

In March 1998, First Quantum Minerals Ltd. of Canada signed two agreements with Gécamines for the retreatment of four large, high-grade copper-cobalt tailings dumps—the Kingamiambo and the Luilu tailings dumps located in the Kolwezi district and the Panda and the Shituru tailings dumps located at Likasi. Earlier in 1999, First Quantum had curtailed development activities owing to the political situation but was actively pursuing financing partners for what they described as economically robust projects once the political climate stabilizes. For the Kolwezi Copper/Cobalt Tailings Project, First Quantum reported measured resources at the Kingamiambo sulfide dump of 14.82 million metric tons (Mt) grading 1.13% copper and 0.26% cobalt. Measured resources were 13.78 Mt grading 1.98% copper and 0.35% cobalt at the Luilu hydrometallurgical tailings dumps. Because of its simpler metallurgical process for the recovery of metals, the Likasi Tailings Project would be developed before the Kolwezi Tailings Project. By financing the costs of the feasibility study and development of the project, First Quantum would earn a 51% interest the Kolwezi Project with Gécamines holding 49%. These costs would be repayable from up to 85% of net income. At the Likasi Tailings Project, First Quantum evaluated four tailings dumps at Panda and Shituru. At the Panda 1 dump, measured resources were reported to be 2.32 Mt grading 1.52% copper and 0.23% cobalt; at the Panda 2 dump, 4.28 Mt grading 1.63% copper and 0.21% cobalt; at the Panda Laverie dump, 1.08 Mt grading 3.70% copper and 0.37% cobalt; and at the Shituru dump, 7.28 Mt grading 1.38% copper and 0.21% cobalt. An internal scoping study for Phase 1 of the Likasi Project proposed building a tailings reprocessing plant to treat 1 million metric tons per year (Mt/yr) of Panda 1, Panda 2, and Panda Laverie tailings that would yield 13,500 t/yr of copper cathode and 1,487 t/yr of cobalt (First Quantum Minerals Ltd., September 17, 1999, Property development, accessed October 8, 1999, at URL [http://www.first-quantum.com/property\\_development.html](http://www.first-quantum.com/property_development.html)).

The acquisition of 51% working interest in the Kambove and the Kakanda copper/cobalt tailings reprocessing projects from Gécamines by International Panorama Resources Corp. (IPR) of

Canada in August 1996 was formally ratified by the new Government in June 1997; Gécamines was to receive a 1.5% royalty of the net profits after the capital payback period. Gécamines estimated the resource in tailings to be 61 Mt averaging 0.98% copper and 0.19% cobalt. Metallurgical tests by IPR suggested that the Kambove tailings were uneconomic owing to excessive acid consumption. During 1997, IPR spent around \$4 million on the project principally on a feasibility study of the Kakanda Project conducted by Bateman Minerals & Industrial Ltd. of South Africa. The study outlined a “defined tailings reserve” of 18.4 Mt grading 1.22% copper and 0.15% cobalt and “measured minable open pit resource” of 11.3 Mt grading 3.14% copper and 0.19% cobalt. The study called for a capital cost of \$270 million to treat 3 Mt/yr of tailings for the first 7 years and then 2 Mt/yr of new mined material for an additional 7 years. The project would include an acid plant, an agitated vat leach stage, and a solvent extraction-electrowinning plant designed to produce 3,500 t/yr of cobalt cathodes and 54,000 t/yr of copper cathodes. Long-term commodity prices used for the feasibility study, which projected a 2-year capital payback, were \$11 per pound for cobalt and \$1 per pound for copper (International Panorama Resources Corp., October 23, 1997, Feasibility study confirms economic viability of copper/cobalt project in Democratic Republic of Congo, press release, accessed November 12, 1997, at URL <http://www.intlpanorama.com/news/oct23.html>). During 1998, the new Government ratified the agreement with IPR and Gécamines; the project was, however, essentially on hold by yearend.

AMF went through a tumultuous year during which Gécamines rescinded AMF’s rights to the Kolwezi Tailings Project, and AMF filed a \$3 billion lawsuit against the Anglo American Corp. of South Africa in a U.S. court for alleged interference with its agreement with Gécamines. Following internal management changes, AMF withdrew its lawsuit and reached an amicable agreement with Anglo American. In June 1998, AMF entered into a new 50-50 joint-venture agreement with Anglo American to develop the Kolwezi Tailings Project. The new joint venture was to be known as Congo Mineral Developments Ltd. (CMD). Anglo American funded CMD with an initial \$16 million to complete a bankable feasibility study of the Project and to secure its financing. CMD subsequently signed a Mining Convention with the Government and Gécamines for the transfer of ownership of the Project to a new company, KMT Sarl, to be held by CMD (60%) and by Gécamines (40%). The new Convention, which was subject to presidential ratification, provided for payments totaling \$130 million to be made to Gécamines in consideration of the transfer of the Kolwezi Tailings Project to KMT Sarl. The project had a provisionally estimated reserve of 112 Mt at average grades of 1.49% copper and 0.32% cobalt. Projected production was estimated to be 75,000 t/yr of copper and 7,500 t/yr of cobalt. The life of the project was estimated to be approximately 20 years. Capital expenditure was estimated on a prefeasibility basis at \$350 million with an implementation period of 2 years (America Mineral Fields, Inc., January 26, 1999, Kolwezi tailings convention signed, news release, accessed December 22, 1999, at URL

[http://www.am-min.com/99/jan26\\_99.htm](http://www.am-min.com/99/jan26_99.htm); America Mineral Fields Inc., 1999, Democratic Republic of Congo—Mineral properties—Consolidated financial statements, notes to consolidated financial statements for 1998, accessed December 22, 1999, at URL <http://www.am-min.com/reports.html>).

In February 1998, the Government approved Anvil Mining NL of Australia’s Mining Convention for the right to explore and develop the Dikulushi copper-silver concession in southeastern Congo (Kinshasa) near the Zambian border west of Pweto and Lac Moero. In May 1998, Anvil announced the results of a prefeasibility study that showed the project to be technically and financially viable. A two-phase project would produce 260,000 t/yr ore for first 4 years and 120,000 t/yr for the second 4 years at a capital cost of \$33 million. The project would concurrently produce ore from an underground mine at a rate of 120,000 t/yr and from an open pit mine at a rate of 140,000 t/yr on the basis of the previously reported resources. Life-of-mine head grades would average 8.9% copper and 289 grams per metric ton (g/t) silver. Production for the first 4 years would average 22,000 t of copper and 71,538 kilograms (kg) of silver. Flotation concentrate of 60% copper and 1,935 g/t silver would be shipped to the Zambian Copperbelt for smelting and refining (Anvil Mining NL, May 14, 1998, Dikulushi project prefeasibility study positive, Australian Stock Exchange announcement, accessed July 22, 1999, at URL <http://www.anvil.com.au/Asx/avl140598.htm>). Faced with the difficulty of obtaining financing for such a project given the political risks in the country, Anvil Mining was reconsidering development options to reduce capital costs by one-half that would include starting with the open pit mine only and buying used equipment. By yearend, the project was essentially on hold pending resolution of the political situation in Congo (Kinshasa). During 1998, First Quantum increased their holdings in Anvil Mining to 19%.

During 1998, Tenke Mining Corp. (TMC) of Canada (55%) in joint venture with Gécamines (45%) continued to examine the feasibility of developing the Tenke Fungurume copper-cobalt deposits located within two concessions totaling 1,437 km<sup>2</sup> in Katanga (Shaba) Province approximately 175 kilometers (km) northwest of the city of Lubumbashi. In December, TMC concluded an option agreement with BHP Copper of Australia whereby BHP would directly or indirectly acquire a 45% ownership interest in the Tenke Fungurume concession in return for providing certain development funding. A draft feasibility study was prepared for a project with a capital cost of around \$400 million. Initial production would include 100,000 t/yr of copper with expansion plans to more than double copper production at a later time. Cobalt capacity would be expanded to match sales contracts with up to 6,000 t/yr planned in the first 4 years and would increase to 13,000 t/yr of cobalt in future expansions. Preliminary plans call for a mine production of 85 Mt/yr of oxide ore at an average acid-soluble grade of 3.19% copper and 0.29% cobalt during an initial 15-year life. The Tenke Fungurume copper-cobalt concessions were estimated to contain a resource base of more than 500 Mt grading 3.5% copper and 0.27% cobalt. Further extensive reserves are available, and production can be progressively expanded. Further open pit oxide reserves will be proven

up, and the extensive sulfide resource underlying the oxide zone is known to extend well below 500 meters in the areas tested and over a strike length of up to 100 km. Much of the sulfide is accessible by open pit methods (Tenke Mining Corp., 1999, Tenke Fungurume, accessed November 12, 1999, at URL <http://www.tenke.com>). On February 23, 1999, TMC declared force majeure in accordance with its Tenke Fungurume agreements with Gécamines and the Government because “the continuing military turmoil and political events in the DRC, which commenced on or around 2 August 1998, materially affected the Company’s ability to carry out the Tenke Fungurume Project. These events entail and continue to entail material changes as to the conditions of development and operation of the Project (including power supply, transportation and construction resources) and thereby undermine the existing draft feasibility study and make it presently impossible to produce a final feasibility study. Accordingly, notice was given of Force Majeure in accordance with the Company’s agreements and this has the effect of adjusting all time periods and dates under these agreements by taking into account the extension and delay arising out of these events of Force Majeure. This includes the obligation to complete the feasibility study and the payment of the transfer bonuses. The option agreement with BHP Copper is unaffected by this declaration” (Tenke Mining Corp., February 23 1999, Force majeure declared, news release, accessed February 26, 1999, at URL <http://www.tenke.com>).

**Gold.**—Société Aurifère du Kivu et du Maniema S.A.R.L. (SAKIMA), which is controlled by Banro Resource Corp. of Canada (93%) and the Government (7%) was established in January 1997 to operate the former SOMINKI gold, tantalum, and tin mines and other land holdings in the region. The old SOMINKI holdings included 10 mining permits and 47 mining concessions covering 10,271 km<sup>2</sup>. Gold holdings southwest of Bukavu in Kivu Province included the Kamituga-Mobale underground gold mines, which were forced to close during the 1997 civil war, and the Lugushwa, the Namoya, and the Twanziga properties. By the presidential decrees of July 29, 1998, however, the Government, without prior warning or consultation with Banro, dissolved SAKIMA through which Banro held its mineral properties and carried on business in Congo (Kinshasa), terminated the company’s Mining Convention relating to the company’s mineral properties, created Société Minière du Congo S.A.R.L. (Somico), and appointed certain Congolese Government nominees as officers of Somico. The action put Banro’s ownership of certain SAKIMA mining concessions and related assets in question (Banro Resource Corp, March 19, 1999, Uncertainty regarding interest in the Democratic Republic of Congo—Consolidated financial statements, December 31, 1998 and 1997—Notes to consolidated financial statements, accessed April 1, 1999, at URL <http://www.banro.com/123198.html>). Because military hostilities began in August within the Provinces of Maniema, North Kivu, and South Kivu in eastern Congo (Kinshasa), Banro was forced to evacuate all employees from the area. In accord with provisions of its Mining Convention with the Government, Banro filed a suit for \$1 billion in compensation

claims with the International Center for the Settlement of Investment Disputes (ICSID); it was accepted for arbitration in October 1998 (Banro Resource Corp, October 29, 1998, Arbitration of Banro \$1 billion claim to proceed, news release, accessed April 1, 1999, at URL, <http://www.banro.com/releases/10-29-98.html>). The first Arbitral Tribunal was scheduled to be convened by the ICSID in Washington, DC, on May 7, 1999.

During 1998, Barrick Gold Corp. of Canada was joined by AngloGold Ltd. of South Africa in evaluating a 57,000-km<sup>2</sup> exploration concession near the Kilo-Moto goldfields in the Bunia area of northern Congo (Kinshasa), adjoining Sudan to the north and Uganda to the east. Initial geochemical and drilling efforts identified a mineralized open pit deposit near the town of Doko that contained approximately 40,400 kg of refractory gold. Work was stopped in late August when the onset of civil unrest forced the companies to withdraw personnel, data, and equipment to a safer location (AngloGold Ltd. 1999).

During 1998, Ashanti resolved its ownership dispute with the Government and the previous title holder and took over operation of the 2,000-km<sup>2</sup> Kilo-Moto Mining International S.A.R.L. (Kimin) concession in the rebel-controlled Eastern Province.

**Manganese.**—Cluff Mining PLC of the United Kingdom signed a joint-venture agreement with the Government and the state-owned Enterprise Minière de Kisenge-Manganese to revive the Kisenge manganese ore mine and to erect a 60,000-t/yr ferromanganese or silicomanganese plant. The Kisenge Mine, which was formerly owned by Belgium’s BCK Manganese Company, was nationalized in 1974 and has been completely dormant since about 1990. At its peak, the mine produced 300,000 t/yr of high-grade manganese ore from three open pits. Remaining proven reserves have been estimated to be 7 Mt, and there was a 600,000 t stockpile of washed and screened ore (Mbendi Information Services, July 1, 1999, Democratic Republic of Congo—Mining industry—Other minerals, accessed December 22, 1999, at URL <http://mbendi.co.za/indy/ming/mingzr.htm>).

**Zinc.**—An August 1996 framework agreement between Gécamines and AMF to prepare a feasibility study on the reopening of the Kipushi zinc-copper mine, rehabilitating the concentrator, and reprocessing the existing tailings expired in October 1998. AMF was then informed by Gécamines that the terms of the option agreement would remain in effect for the foreseeable future (America Mineral Fields Inc., 1999, Annual report of American Mineral Fields Inc for 1998, accessed December 22, 1999, at URL <http://www.am-min.com/reports.html>). Under the original agreement, AMF could acquire a 51% equity interest if a successful feasibility study led to another agreement with Gécamines to rehabilitate the mine and smelter, which had closed in 1993. Preliminary estimates by AMF projected a cost of \$30 million to renovate the mine and mill, which produced 143,000 t/yr of zinc and 43,000 t/yr of copper during its peak production year of 1988. The Kipushi Mine was also a major source of germanium. A feasibility

study of building a smelter to produce 200,000 t/yr of zinc, 30,000 t/yr of copper, and 400,000 t/yr of sulfuric acid was underway. Capital costs for the smelter were projected to be about \$350 million. Watts, Griffis and McOuat of Canada, an AMF consultant, confirmed Gécamines' earlier estimates of remaining measured resources of 9.9 Mt at 2.51% copper, 0.47% lead, and 9.96% zinc. Combined measured and indicated mineral resources were 20.6 Mt grading 2.27% copper, 0.47% lead, and 15.18% zinc. After 10% dilution, minable proved and probable reserves, were given as 22.6 Mt grading 2.06% copper and 13.81% zinc. An additional indicated mineral resource of approximately 16 million cubic meters of Kipushi tailings graded an average 0.36% copper, 1.62% lead, and 2.25% zinc (American Mineral Fields Inc., 1996, The Kipushi project, Zaire, accessed September 22, 1997, at URL <http://am-min.com/96/kipushi/kproj.html>).

### ***Industrial Minerals***

MIBA accounted for about one-quarter of the total national production of diamonds from mining operations in Mbuji Mayi in Kasai Province. MIBA was owned by the Government (80%) and by the Sibeka Group (20%), which was owned by Union Minière of Belgium (79%) and De Beers Centenary AG (De Beers) (20%). MIBA produced 6.4 million carats per year of low-value, near-gem-quality stones in 1998, an increase of 18% from that of 1997. In an effort to exercise more control over the diamond industry, the Government established a new department, referred to as SASMIP, to buy precious minerals, and to ban the use of U.S. dollars in diamond sales and the travel of foreign buyers to the diamond areas. The new policy was resisted by the artisanal diamond operators and official exports dropped sharply (Mabiola, 1999).

### ***Mineral Fuels***

Zaire Gulf Oil Co., which was owned by Chevron Corporation of the United States (50%), Teikoku Oil Co. Ltd. of Japan (32.3%), and Unocal Corporation of the United States (17.7%), produced approximately 75% of the nation's 29,000 bbl/d of crude petroleum from around 35 offshore wells. The only domestic oil refinery, at Muanda, had a rated capacity of 17,000 bbl/d. Chevron, which operated a 1010-km<sup>2</sup> offshore concession, produced crude oil from eight offshore fields; production averaged 20,000 bbl/d day in 1998. Work by Chevron concentrated on development drilling, not exploratory drilling. The company announced that approximately 95% of its concession area was covered with three-dimensional seismic data. Processing of the new seismic data was completed in 1998, and interpretation was scheduled to begin in 1999 (Chevron Corp., 1999, Democratic Republic of Congo, Worldwide Upstream supplement to 1998 annual report, accessed December 22, 1999, at URL <http://www.chevron.com/finance/annual-98-supplement/p10.html>).

### **Reserves**

Major mineral resources were generally considered to be

sufficient for many years of production with known copper ore grades running two to eight times the grade of typical copper ore mined in North America and South America. Reserve data on copper, cobalt, gold, and zinc, however, have not been updated for several years and must be reevaluated in light of current (1998-99) economic conditions in Congo (Kinshasa) and the deterioration of Gécamines' mines and other facilities. At yearend 1997, reserves of oil and gas were 187 million barrels of oil and 1.4 billion cubic meters, respectively (PennWell Publishing Co., 1998). As of 1996, estimated recoverable coal reserves were 88 Mt (U.S. Energy Information Administration, August 1998, Southern African Development Community, Table 5. SADC energy overview—Coal, accessed July 8, 1999, at URL <http://www.eia.doe.gov/emeu/cabs/sadc.html>).

### **Infrastructure**

Congo (Kinshasa) is an essentially landlocked country, with only a small coastal area on the Atlantic Ocean. The main port of Matadi, with a 160-km river approach, has had difficulty operating at its 2-Mt/yr cargo capacity. Waterfalls below the capital of Kinshasa make the Congo River unnavigable to the sea and limit the significance of the world's second largest river as a significant export route, although it is a key inland commercial route.

A combination of air, railroad, road, and river boat transport was used to move equipment, food, and other supplies into the mining and mineral-processing regions and for exporting ores, concentrates, and finished mineral products. Even prior to the breakout of civil war, much of this transport network was in varying degrees of disrepair. Locomotive and rolling stock shortages were also a problem. The Sizarail line was a critical logistical support link for the diamond industry between the Zambian border and Mbuji Maya.

The major companies involved in transportation were Government owned. Small private trucking and river boat companies provided limited local service. Historically, mineral products were sometimes shipped from the Copperbelt west on the Voie Nationale, a difficult road-rail-water route and the only transport route entirely within the country to Matadi, through Zambia on the Tazara railroad to the port of Dar es Salaam in Tanzania; and through Zambia to southern rail lines that lead to bulk-loading export ports in South Africa. Copper shipments could take 45 days to get from the plant to the dock, either south via Zambia and Zimbabwe or eastward along the Tazara railroad via Zambia and Tanzania. Owing to rail and river transport problems, most cobalt and copper wirebar products were shipped via truck convoy to the port of Durban in South Africa. High-value cobalt, diamonds, and gold are commonly flown out of the country.

Shaba Province, the site of most of the country's mining activity, historically consumed almost 50% of the nation's generated electrical power. A portion of the electricity used in the Shaba region was delivered by the 1,800-km-long, 560-megawatt Inga-Shaba transmission line, which runs from the Inga Dam on the Congo River south of Kinshasa to the Copperbelt city of Kolwezi in Shaba Province. Nevertheless,

the tremendous hydroelectric potential of the Congo River remained largely untapped. For energy requirements at its mine and metallurgical operations, Gécamines was dependent on imported coke and refined petroleum products.

## Outlook

The short-term economic prospects for Congo (Kinshasa) are poor and further threatened by civil wars, turnovers of Governments, and refugee problems and ethnic conflicts in the eastern provinces bordering Rwanda and Uganda. The decline of copper and cobalt production during the 1990's has led to the deterioration of the country's most important company, Gécamines. Despite almost insurmountable operating difficulties, Gécamines continued to operate, albeit at limited capacity. Changing Government policies promoting privatization of the state-run mining sector to attract new foreign capital and technical expertise holds some hope for the future but requires stronger guarantees of property title and investment security by the Government. Because of its size and wealth of resources, the long-term potential of Congo (Kinshasa) is more promising, and the country could return to world markets as an important supplier of copper, cobalt, diamond, and zinc. The future prospects for economic development of Congo (Kinshasa) depend on its ability to achieve political and economic stability, to mobilize its resources, to control Government spending, and to attract new foreign investment.

## References Cited

- AngloGold Ltd., 1999, Annual review 1998: AngloGold Ltd., p. 16-17.  
Block, Robert, 1998, Congo names Zimbabwean head of mining concern: Wall Street Journal, November 9, p. A20.  
Mabiola, Yenga, 1999, Democratic Republic of Congo, *in* Africa annual review supplement: Mining Journal [London], v. 333, no. 8538, July 2, p. 83.  
Metal Bulletin, 1998a, Congo fires warning shot at mining companies: Metal Bulletin, no. 8242, January 8, p. 3.  
———1998b, DRC troubles not affecting mining: Metal Bulletin, no. 8304, August 24, p. 3.  
OM Group, Inc., 1999, Annual report of OM Group, Inc., for 1998: Cleveland, Ohio, OM Group, Inc., 16 p.  
PennWell Publishing Co., 1998, International petroleum encyclopedia—1997: Tulsa, Oklahoma, PennWell Publishing Co., p. 293.  
Swana, M.K., 1998, Cobalt from Congo—Past-present-future: Cobalt Development Institute, Cobalt Conference, Toronto, May 27-28, 1998, written presentation, 15 p.

## Major Source of Information

Ministère des Mines  
3ème Niveau, Building Gécamines  
Boulevard du 30 Juin  
Kinshasa/Gombe  
République Démocratique du Congo  
Fax: (243)-(12)-21-607  
Telephone: (243)-(12)-21-538  
E-mail: minimes@ic.cd  
Web site: <http://www.ministere-mines.gov.cd>

TABLE 1  
CONGO (KINSHASA): PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1994	1995	1996	1997	1998 e/
<b>METALS</b>					
<b>Cobalt:</b>					
Mine output, Co content	826	1,647	2,000 e/	3,500 e/	1,500
<b>Metal, Co content:</b>					
Refinery (salable products)	2,439 r/	3,422 r/	3,540 r/	3,700 e/	3,600
White alloy, matte	945	546	2,300 e/	341 e/	344
Total	3,384	3,968	5,840	4,041 r/ 2/	3,944 2/
<b>Columbium and tantalum:</b>					
<b>Columbite-tantalite concentrate:</b>					
Gross weight kilograms	4,120	--	--	--	--
Nb content e/ do.	1,000	--	--	--	--
Ta content e/ do.	1,000	--	--	--	--
<b>Copper: 3/</b>					
<b>Mine output:</b>					
By concentration or cementation	7,200	6,800	6,200	--	--
Leaching (electrowon)	22,800	22,600	43,800 r/	39,651 r/ 2/	34,994 2/
Total	30,000	29,400	50,000 r/	39,651 r/ 2/	34,944 2/
<b>Metal:</b>					
<b>Smelter, primary:</b>					
Electrowon (low grade)	22,800	22,600	43,800 r/	40,000	35,000
Other	7,200	6,200	6,000	--	--
Total	30,000	28,800	49,800 r/	40,000	35,000
<b>Refinery, primary:</b>					
Electrowon	--	--	--	--	--
Other	29,000	33,000	42,200 r/	40,000	35,000
Total	29,000	33,000	42,200 r/	40,000	35,000
Gold 4/ kilograms	780	1,180	1,252	394	134
Silver e/ do.	900	900	500	500	500
<b>Tin:</b>					
Mine output, Sn content	100 r/	-- r/	-- r/	--	--
Smelter, primary e/	50	--	--	--	--
<b>Zinc:</b>					
Mine output, Zn content	500 r/	4,500 r/	3,200 r/	1,686 r/ 2/	1,234 2/
<b>INDUSTRIAL MINERALS</b>					
Cement, hydraulic	166,000 e/	235,000 e/	240,800 r/	124,900 r/	100,000
<b>Diamond: e/</b>					
Gem thousand carats	3,000	4,000	3,000	3,300 e/	4,500
Industrial do.	13,300	13,000	17,600	18,900 e/	20,000
Total do.	16,300	17,000	20,600	21,000 r/ 2/	24,500 2/
Lime e/	50,000	50,000	50,000	50,000	50,000
Stone, crushed e/	200,000	200,000	200,000	200,000	200,000
<b>MINERAL FUELS AND RELATED MATERIALS</b>					
Coal, bituminous e/	11,000 4/	10,000	10,000	5,000 e/	5,000
<b>Petroleum:</b>					
Crude thousand 42-gallon barrels	9,125	10,220	10,000 e/	10,950 e/	10,950
<b>Refinery products:</b>					
Liquefied petroleum gas e/ do.	5	5	1	1	1
Gasoline do.	365	365 e/	89 e/	89 e/	89
Kerosene and jet fuel do.	545	545 e/	135 e/	135 e/	135
Distillate fuel oil do.	365	365 e/	90 e/	90 e/	90
Residual fuel oil do.	1,095	1,095 e/	280 e/	280 e/	280
Refinery fuel and losses 5/ do.	545	545	135	135	135
Total do.	2,920	2,920 e/	730 e/	730 e/	730

e/ Estimated. r/ Revised.

1/ Table includes data available through December 1999.

2/ Reported figure.

3/ Terms are used as defined by the International Copper Study Group.

4/ Reported by Banc Centrale du Congo. Gold Field Mineral Services estimates production from all sources to be 5,000 to 10,000 kilograms.

5/ Includes "Other."