

THE MINERAL INDUSTRY OF CONGO (KINSHASA)

By George J. Coakley

Following the military victory of the Alliance of Democratic Forces for the Liberation of Zaire-Congo (ADFL), which was opposed to the former Government of Zaire, the country was officially renamed the Democratic Republic of the Congo [Congo (Kinshasa)] on May 29, 1997. Located in the heart of equatorial central Africa, Congo (Kinshasa) has an area of 2,267,600 square kilometers (km²), about one-quarter the size of the United States. The area supported a population of about 49 million in 1997 with a gross domestic product (GDP) per capita of \$400 based on 1996 purchasing power parity data. Disruptions caused by the civil war in 1997 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 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.

The state-owned La Générale des Carrières et des Mines (Gecamines), formerly the nation's major foreign currency export earner, continued its struggle to maintain copper production at from 5% to 10% of capacity. A program begun in 1994 to focus on high-unit-value cobalt production gave some returns as cobalt mine production increased 25% and refined cobalt, with a focus on the processing of stockpiled cobalt hydrates, increased by 52% in 1996 compared with those of 1995. With stockpiles depleted and with productivity impacted by the war, refined cobalt production declined by 50%, to 3,000 metric tons (t), in 1997.

The deterioration of the overall economy and the lack of reinvestment of Gecamines revenues in routine maintenance and capital development have contributed to this decline in the industrial mainstay of the economy. 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. Hyperinflation and the further disintegration of the economy continued in 1997 as the internal economies of the key mining provinces of Kasai, Kivu, and Shaba operated almost independently of support from the central Government. The national economy was also adversely affected by the massive Rwandan refugee camps near Goma that affected the northeast region's gold and columbium (niobium) production.

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 and

Energy.

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 Gecamines 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 Gecamines, 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 over 100 preliminary agreements for exclusive exploration zones (ZER or zones exclusives de recherche) had 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 (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. on its Kolwezi copper-cobalt tailings project and Ashanti Goldfields Company Ltd. on the Okimo gold mine. During the year, 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 the State-owned railroad, Sizarail.

Production and Trade

As estimated in table 1, production of most commodities declined sharply in 1997. Diamond production appeared to be up, but exact figures are uncertain owing to the high level of smuggling and undocumented production. Crude petroleum production remained constant at around 29,000 barrels per day (bbl/d). The more-significant mineral commodities exported were cobalt, copper, diamond, gold, and crude oil. Historically, the main trading partners of Congo (Kinshasa) were Belgium, France, Germany, Japan, South Africa, and the United States.

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. Gecamines, the principal parastatal company, produced essentially all of the country's coal, cobalt, and copper. Gecamines also operated subsidiaries that produced cement and other materials required for its primary mineral interests. MIBA, which was 80% owned by the Government, produced about 25% of industrial diamond production with the remainder coming from small artisanal operators. Sominki and Okimo were the other principal parastatal mining companies.

Commodity Review

Metals

Copper and Cobalt.—Gecamines holdings in the Copperbelt of Shaba Province contain one of the greatest concentrations of high-grade copper and coproduct cobalt resources in the world; since 1993, in particular, most mining operations, however, have come to a standstill; total capacity utilization was at less than 10%. Gecamines 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 electricity 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.

Under Gecamines survival plan, initiated in 1994, cobalt became the company's primary foreign currency earner in the past few years. Treating stockpiled cobalt hydrates, Gecamines brought total refined cobalt metal production up to 4,000 t in 1995 and 6,000 t, with a market value of nearly \$340 million, in 1996, dropping back to 3,000 t in 1997. To attract the capital needed to revitalize operations, Gecamines was using joint ventures with foreign investors and retaining up to 49% equity interest in these joint venture arrangements; most ranged from 20% to 45%. In addition to treating stockpiled hydrates, Gecamines 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. Gecamines 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).

In April 1997, Gecamines signed an agreement with the 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 reopen the Luiswishi copper-cobalt mine, which had been closed since 1962. EGMF agreed to develop the mine and to build a new concentrator. OMG, in turn, agreed to purchase all concentrate production to feed its OMG Kokkola Chemical plant in Finland. Luiswishi reopened in November 1997; the project was scheduled to produce 13,300

metric tons per year (t/yr) copper and 2,800 t/yr cobalt over 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>). In June 1997, the OMG and EGMF signed a contract with Gecamines to build a 5,000 t/y cobalt smelter in Lubumbashi to produce cobalt-copper alloys from concentrate converter slags. The \$18 million slag treatment plant was scheduled to be completed within 2 years by the Finnish company, Outokumpu Oy. The alloy product will be sent to OMG's Kokkola refinery in Finland for final processing (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 September 1997, International Ballater Resources Inc. and First Quantum Minerals Ltd. of Canada, through its 70% owned International Quantum Resources Ltd. (IQR), signed a preliminary agreement with Gecamines to acquire the rights to two tailings dumps at Kingamiambo and Luilu in the Kolwezi district. Gecamines data for 35 years of tailings from the Dima, Kamoto, and Kolwezi concentrators dumped at Liulu indicated a dump size of 20 million to 30 million metric tons (Mt) containing approximately 2% to 3% copper and 0.2% to 0.4% cobalt. Gecamines estimated the tonnage and grade of the Kingamiambo dumps to be between 15 and 25 Mt at between 1% and 2% copper and 0.1% and 0.3% cobalt. IQR will acquire a 51% interest in the two dumps by carrying out feasibility studies and financing 100% of development costs (First Quantum Minerals Ltd., September 15, 1997, Announce acceptance of proposals to acquire tailings dumps, news release, accessed October 27, 1997 at URL http://www.first-quantum.com/news_97/091597.html).

Union Miniere (UM) of Belgium, in joint venture with Gecamines, operated the rehabilitated Kasombo cobalt mine and upgraded the Shituru hydrometallurgical cobalt processing plant near Likasi in 1997. The cobalt plant was expected to increase cobalt recoveries by several hundred tons per year.

Formally ratified by the new Government in June 1997, International Panorama Resources Corp. (IPR) of Canada had acquired 51% working interest from Gecamines in August 1996 to reprocess copper/cobalt tailings from Kambove and Kakanda mines; Gecamines was to receive a 1.5% royalty of the net profits after the capital payback period. Gecamines 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 million metric tons per year (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>).

An agreement between AMF and the new government on the Kolwezi project and its exploration program was ratified on April 16, 1997. Under the agreement with Gecamines, AMF can earn a 51% interest in the Kolwezi copper-cobalt tailings project with a capital investment of \$350 million. The Kolwezi resource contained 104.5 Mt of tailings grading 1.34% copper and 0.26% cobalt. Plans called for construction of a processing plant to recover 50,000 t/yr of copper and 6,000 t/yr of cobalt. On December 31, 1997, AMF reported receiving a communique from Gecamines that “the tender process had not met the needs of the nation and that it had been terminated until a new arrangement could be put in place” (American Mineral Fields Inc., December 31, 1997, Congo negotiations update, news release, accessed January 6, 1998, at URL <http://www.am-min.com/amf/96/news/dec31-97.html>). On January 7, 1998, AMF announced that they were suing Anglo American in a Texas court for \$3 billion claiming that Anglo American had “interfered with the company’s agreements (with respect to the Kolwezi tailings project) in the Democratic Republic of Congo” (American Mineral Fields Inc., January 7, 1998, American Mineral fields launches US\$3 billion Texas legal action against Anglo American/De Beers/ Minorco Group, news release, accessed January 8, 1998, at URL <http://www.am-min.com/amf/96/news/jan7-98.html>). The Chairman of Gecamines subsequently released a clarification of its position regarding the AMF agreements in which he claimed: a June 1997 pre-feasibility study on the Kipushi Mine rehabilitation project by AMF was not adequate to meet Gecamines expectations; a study on the Kipushi tailings retreatment plant had yet to be submitted; no progress had been made on the exploration program; and raised questions on irregularities in the agreement on Kolwezi (M.K. Swana, January 20, 1998, Letter from Chairman, Gecamines to The Marek Enterprise, Inc., Reston, Virginia, USA, on clarification from Gecamines relating to the Kolwezi concentrator tailings project, accessed February 19, 1998 at URL <http://www.marekinc.com/AflsBusMine012098.html>). According to other reports Gecamines also expected bidders on its various project agreements to make substantial up-front cash payments in exchange for Gecamines equity released and to accelerate project work (Metal Bulletin, 1998). In early 1996, AMF had entered into an agreement with Gecamines covering the following areas: the rehabilitation of the Kipushi underground zinc mine and concentrator; the creation of a joint venture to construct a zinc tailings treatment plant and a new zinc refining plant at Kipushi; exploration on two of Gecamine’s exclusive research zones for copper and tin in southern Shaba Province; and the reprocessing of copper and cobalt tailings at the Kolwezi concentrator. In May 1996, AMF concluded a Heads of Agreement with Anglo American Corporation of South Africa Limited. Under the agreement, Anglo American could contribute up to \$100 million in equity funding to earn a 50-50 interest in a joint company with

AMF on the Kipushi and the Kolwezi projects.

Anvil Mining NL of Australia acquired a 90% interest in the Dikulushi copper-silver project in southeastern Congo (Kinshasa) near the Zambian border west of Pweto and Lac Moero in September 1996. The mining convention, covering a 12,945-km² area, was formally signed in January 1997. During 1997, work began on due diligence exploration drilling aimed at defining a shallow open-pit resource and on a prefeasibility study on the Dikulushi project. Previous work by the Bureau de Recherches Géologiques et Minières of France in the 1970’s was reported by Anvil as a measured and indicated resource of 1.66 Mt grading 11% copper and 310 grams per metric ton (g/t) silver at Dikulushi (Anvil Mining NL, February 3, 1997, Dikulushi copper silver project, Australian Stock Exchange announcement, accessed July 8, 1998 at URL http://erd.pair.com/Anvil_Mining/avl0203.htm). Preliminary metallurgical tests indicated that the copper mineralization was amenable to flotation and that a 60% copper concentrate could be produced with high silver credits (Anvil Mining NL, 1998, Annual report of Anvil Mining NL for 1997, Review of operations, accessed July 8, 1998 at URL http://erd.pair.com/Anvil_Mining/ar97.htm). Work plans for 1998 called for completion of the Dikulushi feasibility study and the beginning of underground sampling and surface exploration of the Kapulo copper project within their concession area. The Kapulo area contained a number of small, high-grade chalcocite vein deposits that had not been worked since the late 1950’s. In August 1997 First Quantum Minerals Ltd. acquired a 10% equity interest in Anvil Mining.

In November 1996, the Canadian company, Consolidated Eurocan Ventures Ltd., a subsidiary of Lundin Holdings Ltd. of Bermuda, acquired a 55% interest in the Tenke-Fungurume copper deposits from Gecamines. In January 1997, Consolidated Eurocan Ventures changed its corporate name to Tenke Mining Corp. (TMC). Gecamines will retain a 45% equity interest and receive compensation of \$250 million in three installments from TMC. Following a renewal of the accord with the new Government, TMC paid the first installment of \$50 million to Gecamines on May 7, 1997; \$40 million will be due 130 days after completing a favorable feasibility study, and a final payment of \$160 million will be due on May 7, 2003. Based on geological data gathered in the 1970’s when efforts were first being made to develop the property, the company estimated the known Tenke-Fungurume resources to be 222 Mt grading 4.42% copper and 0.33% cobalt and proven reserves to be 92.6 Mt grading 4.59% copper and 0.36% cobalt (Tenke Mining Corp., 1997c). To put the high grade of the copper ore of the Tenke-Fungurume deposits and the low-unit-cost potential of this project in perspective the copper grade is more than eight times richer than the average grade of copper ore mined in the United States (0.57%). A \$ 6 million exploration program and a \$12 million feasibility study were initiated in April 1997. The feasibility study was based on constructing an open-pit mine and copper recovery plant designed to produce 100,000 t/yr of copper metal and 8,000 t/yr of cobalt metal during a first phase with a later expansion to 400,000 t/yr of copper. Initial operations would be solely vat leach oxide ore treatment with sulfide facilities added in eighth year of operations (Tenke Mining Corp., 1997b). Subject to completion of the feasibility study, arrangement for project financing, and continued

political stability in the country, the first phase of the project was planned to begin production during 2000 at a cost of \$390 million. Exploration during 1997 was centered in the Dipeta syncline, located between the known the Tenke and the Fungurume copper-cobalt deposits. On the basis of the results of a 37 hole drilling program to 500 meters depth in the Dipeta syncline, TMC reported a new drill-indicated resource of 197 Mt grading 4.37% copper and 0.22% cobalt, thus nearly doubling the concession's resource estimate. Included within the top 100 meters of the Dipeta resource estimate was a high-grade supergene enriched zone of oxides containing 50 Mt grading 5.22% copper and 0.26% cobalt. The balance of deeper sulfide resources was 147 Mt grading 4.08% copper and 0.21% cobalt (Tenke Mining Corp., 1997a).

Gold.—In January 1996, Banro Resource Corp. of Canada, through its wholly owned subsidiary, African Mineral Resources Inc., in conjunction with its joint-venture partner, Mines d'Or du Zaire (MDDZ) purchased a 64% interest in SOMINKI for \$3.5 million. Banro and MDDZ jointly controlled 72% of the gold, tin, and tantalum mines and of the land holdings of SOMINKI with the balance retained by the Government. The company owned 10 mining permits and 47 mining concessions covering 10,271 km². Included in the gold holdings southwest of Bukavu in Kivu Province are the producing Kamituga-Mobale underground gold mines which Banro estimated to contain resources of 124,414 kilograms (kg) of contained gold on the basis of past work by SOMINKI, the Twangiza property containing proven and probable open pit oxide reserves of 5.5 Mt grading 4.3 g/t, with possible minable sulfide reserves of 2.7 Mt containing 4,600 kg of gold; the Lugushwa property containing resources on two of its areas of 3 Mt of 4.5 g/t of gold and 2.5 Mt of 4 g/ of gold; and the closed Namoya Mine with reported minable sulfide reserves estimated to be more than 9,330 kg of contained gold. In January 1997, Banro signed a new mining convention with the Government increasing Banro's interest in SOMINKI to 93%, with the Government retaining a 7% carried interest. At the same time, all assets of SOMINKI were transferred into a new company, SAKIMA S.A.R.L. Banro agreed to invest \$15 million and received a 10 year-post production tax moratorium, an elimination of import duties, and the right to export all gold production (Banro Resource Corp, January 31, 1996, Banro completes purchase of SOMINKI S.A.R.L. (Zaire): press release, accessed March 18, 1998, at URL <http://www.banro.com/releases/01-31-96.html>).

The Mobale gold mine was overrun and flooded during the civil war and forced to close in early 1997, leading SAKIMA to shift the exploration emphasis to the Namoya and the Twangiza deposits. The Mobale Mine and 300-metric-tons-per-day mill produced at a rate of 311 kilograms per year (kg/yr) of gold before closing. Following the June 1997 confirmation of Banro's rights to the concession by the ADFL Government, SAKIMA put into action its \$10 million exploration and development plans. On the basis of work through yearend 1997, SAKIMA contractor, CME & Company of Canada, revised resource estimates at the Twangiza deposit to 107 Mt grading 1.96 g/t of gold. A new CME analysis of historical data on five separate gold deposits in the Namoya area produced a total resource of 8.1 Mt grading 3.47

g/t of gold, including an indicated high grade resource of 85,175 t averaging 49.03 g/t of gold. The \$3.7 million Phase II program at Twangiza, including additional exploration drilling, metallurgical work, and a pre-feasibility study, was scheduled to be completed by the end of 1998 (Banro Resource Corp., 1998).

In September 1997, the ADFL Government revisited two concession agreements in the Kilo-Moto goldfields in the Bunia area in northern Congo (Kinshasa) near the Ugandan border. The Government was renegotiating with Barrick Gold Corp. of Canada over the size of its concession. In an effort to attract more investors, the Government wanted to reduce Barrick's original 83,000-km² exploration concession surrounding the Kilo-Moto gold fields of August 1996 to between 5,000 and 20,000 km². At the Okimo gold mines, which had been sold in 1997 and renamed Kilo-Moto Mining International S.A.R.L. (Kimin) the Government suspended operations claiming that the Belgian-owned, Mindev company had failed to meet its investment and development commitments. Production at Kilo-Moto in 1997 was around 50 to 60 kg/yr with the potential for a major increase. The government also questioned the equity ownership share that Mindev claimed to hold in Kimin—49% vs. 82.5%, respectively (William Wallis, September 10, 1997, New Congo terminates Kilo-Moto gold contract, accessed September 10, 1997, at URL http://biz.yahoo.com/finance/97/09/10/abx_asl_y_1.html). Subsequently Ashanti acquired Mindev's share in Kimin for \$5 million, but was unable to begin operations owing to legal challenges to the transaction.

Zinc.—Under the terms of its August 1996 agreement with Gecamines, AMF commissioned Bateman to prepare a feasibility study on the reopening the Kipushi zinc-copper mine, rehabilitating the concentrator, and reprocessing the existing tailings; the study was due by April 1998. AMF can acquire a 51% equity interest if a successful feasibility study leads to another agreement with Gecamines to rehabilitate the mine and smelter, which 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. It 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 around \$350 million. An AMF consultant, Watts, Griffis and McOuat of Canada, confirmed Gecamines's estimates of remaining measured resources at 9.9 Mt at 2.51% copper, 0.47% lead, and 9.96% zinc. Combined measured and indicated mineral resources were 20.6 Mt at 2.27% copper, 0.47% lead, and 15.18% zinc. Movable proved and probable reserves, after 10% dilution, were given as 22.6 Mt at 2.06% copper and 13.81% zinc. An addition 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., The Kipushi project, Zaire, accessed September 22, 1997 at URL <http://am-min.com/96/kipushi/kproj.html>).

Industrial Minerals

Diamond.—MIBA, the major official diamond producer in Congo (Kinshasa), accounted for about 40% of official diamond exports, from mining operations in Mbuji Mayi in Kasi Province. MIBA was owned 80% by the Government and 20% by the Belgian company Sibeka, which is owned by UM (79%) and De Beers (20%). MIBA produced more than 6.8 million carats per year, valued at \$70 million, of near-gem quality stones annually, about one-fifth of the annual estimated diamond production of Congo (Kinshasa) (Diamond International, 1997). With its alluvial deposits nearing exhaustion, MIBA planned to invest \$100 million during the next 5 years to shift production to six kimberlite pipes on its property, which accounted for only 20% of production. MIBA expected one-half of production to come from kimberlites within 2 years (Wrong, 1997). Until mid-1997, De Beers purchased all MIBA's industrial diamond output under an exclusive contract, which was canceled by the ADFL Government. Beginning in June, MIBA diamond production was being sold in open international auction to the highest bidder. The Government's Centre National d'Expertise estimated that more than one-third of the country's diamond production worth, about \$300 million, is smuggled out each year (Mining Journal, 1996; Mulenga, 1997).

Mineral Fuels

Petroleum.—Zaire Gulf Co., which is controlled by Chevron Corporation (United States—50%), Teikoku Oil Co. Ltd. (Japan—32.3%), and Unocal Corporation (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 bbls/d; data on current operating levels, however, were not available.

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 (1997-1998) economic conditions in Congo (Kinshasa) and the deterioration of Gecamines and other facilities. At yearend 1997, reserves of oil and gas were 187 million barrels of oil and 1.4 billion cubic meters of natural gas (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 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. Operations at the 2-million-metric-ton-per-year port of Matadi, with a 160-

kilometer river approach, have suffered from crime and civil unrest in the country. Water falls below 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 railroad, road, and riverboat transport were used to move equipment, food, and other supplies into the mining and mineral-processing regions and 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 are Government owned. Small private trucking and riverboat companies provided limited local service. Historically, mineral products were shipped at times from the Copperbelt west on the Voie Nationale, a difficult road-rail-water route, to the Matadi seaport, the only transport route entirely within the country; through Zambia on the Tazara railroad to the port of Dar es Salaam in Tanzania; and through Zambia to southern rail lines leading 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. 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 can be 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 remains largely untapped. For energy requirements at its mine and metallurgical operations, Gecamines 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 and turnover in Governments, refugee problems and ethnic conflicts in the eastern provinces bordering Rwanda and Uganda. The recent decline of copper and cobalt production had led to the deterioration of the country's most important company, Gecamines. Despite almost insurmountable operating difficulties, Gecamines 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 new Government. Because of its size and wealth of resources of Congo (Kinshasa), long-term potential was more promising, and the country could remain an important supplier of copper, cobalt, diamond, and zinc for years. 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.

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Major Source of Information

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

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997
METALS					
Cadmium, smelter	12	--	--	--	--
Cobalt:					
Mine output, Co content	2,459	826	1,647	2,000 e/	3,500 e/
Metal, Co content:					
Refinery (salable products)	829	2,330 r/	3,410 r/	3,491 r/	2,808
White alloy, matte	1,263 r/	945	557 r/	2,546 r/	195
Total	2,092 r/	3,275 r/	3,967	6,037 r/	3,003
Columbium and tantalum:					
Columbite-tantalite concentrate:					
Gross weight kilograms	20,000 e/	4,120	--	--	--
Cb content e/ do.	5,000	1,000	--	--	--
Ta content e/ do.	5,700	1,000	--	--	--
Pyrochlore concentrate: e/					
Gross weight do.	780,000	--	--	--	--
Cb content do.	350,000	--	--	--	--
Copper: 2/					
Mine output:					
By concentration or cementation	6,900	7,200	6,800	6,200	--
Leaching (electrowon)	39,400	22,800	22,600	43,800 r/	40,100
Total	46,300	30,000	29,400	50,000 r/	40,100
Metal:					
Smelter, primary:					
Electrowon (low grade)	37,100	22,800	22,600	43,800 r/	40,100
Other	5,700	7,200	6,200	6,000	--
Total	42,800	30,000	28,800	49,800 r/	40,100
Refinery, primary:					
Electrowon	2,300	--	--	--	--
Other	34,100	29,000	33,000	42,200 r/	40,100
Total	36,400	29,000	33,000	42,200 r/	40,100
Gold 3/ kilograms	1,502	780	1,180	1,252	394
Silver e/ do.	11,000	900	900	900	900
Thorium, monazite concentrate, gross weight e/ (55% rare-earth oxides)	20	--	--	--	--
Tin:					
Mine output, Sn content	700 e/	100 r/	-- r/	-- r/	--
Smelter, primary e/	50	50	--	--	--
Zinc:					
Mine output, Zn content	6,830	500 r/	4,500 r/	3,200 r/	1,600 r/
Metal, primary, electrolytic	4,150	--	--	--	--
INDUSTRIAL MINERALS					
Cement, hydraulic	149,000	150,000 r/ e/	200,000 r/e/	240,790 4/ r/	124,881 4/
Diamond: e/					
Gem thousand carats	2,000	3,000	4,000	3,000	3,300
Industrial do.	13,600	13,300	13,000	17,600	18,900
Total do.	15,600 4/	16,300	17,000	20,600	22,200
Lime e/	50,000	50,000	50,000	50,000	50,000
Stone, crushed e/	200,000	200,000	100,000 r/	100,000 r/	100,000
Sulfur:					
S content of sulfuric acid from sphalerite e/	2,000	--	--	--	--
Sulfuric acid, gross weight:					
From sphalerite	6,000 e/	--	--	--	--
From imported sulfur	10,000 e/	15,000 e/	--	--	--
Total	16,000 e/	15,000	--	--	--
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous e/	14,000 4/	11,000 4/	70,000 r/	95,000 r/	50,000 e/
Petroleum:					
Crude thousand 42-gallon barrels	8,285	9,125	10,220	10,000 e/	10,600 e/
Refinery products:					
Liquefied petroleum gas e/ do.	25 r/	25 r/	25 r/	25 r/	25
Gasoline do.	365	365	365	365 r/	365 e/

See footnotes at end of table.

