

THE MINERAL INDUSTRY OF

ZAÏRE

By George J. Coakley

In 1995 the mining industry of Zaire saw a further decline in output, continuing, except for the diamond sector, the precipitous drop which began in 1985. Historically, the mining industry accounted for 25% of Zaire's gross domestic product and about three-quarters of total export revenues. The state-owned La Generale des Carrieres et des Mines du Zaire (Gecamines), formerly the nation's major foreign currency export earner, continued to struggle to maintain copper production at only 5 % of peak 1985 output levels. A program begun in 1994 to focus on high unit value cobalt production gave some returns as cobalt mine production more than doubled in 1995 and refined cobalt, using stockpiled cobalt hydrates, increased nearly 50% from 1994. Nevertheless, 1995 cobalt mine production, which is a byproduct of copper, remained at only 8% of 1985 peak levels. During the past 10 years Gecamines share of world output of copper and cobalt has dropped from 5.2% and 67% in 1985 to less than 1% and 8%, respectively, in 1995.

The deterioration of the overall economy of Zaire 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 Zaire's metal mining sector, diamond exports, chiefly from the Kasai provinces, became Zaire's most important source of foreign exchange derived from the mineral sector. Hyperinflation and the further disintegration of the economy continued in 1995 as the internal economies of the key mining Provinces of Kivu and Kasai operated almost independent of support from the central Government. The national economy was also adversely affected by the massive influx of Rwandan refugees into the country near Goma that affected the northeast region's gold and columbium (niobium) production.

Legislation existed relating to all aspects of the mineral industry. Article 10 of the Constitution stated that the soil and subsoil belong to the state. Prospecting, exploration, and exploitation were regulated by Ordinance No. 81-013 of April 2, 1981, and required permits from the Ministry of Mines and Energy.

By yearend, the Zairian Government through the Ministry of Mines, which controls most of the mining enterprises, had begun to set in motion, at the encouragement of the World Bank, efforts to privatize the mining sector and to attract new foreign investment through joint ventures with Gecamines. Targets for privatization or joint venture redevelopment were the more than 20 copper-cobalt and zinc mines and processing facilities owned by Gecamines; the gold-tin producer Societe Miniere et Industrielle de Kivu (Sominki); the major diamond producer

Societe Miniere de Bakwanga (MIBA); and the major gold producer Office des Mines d'Or de Kilo-Moto (Okimo). A number of international mining companies expressed interest in developing the Tenke-Fungurume prospect. The prospect appeared to be the most promising of the undeveloped cobalt-copper properties owned by Gecamines.

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; fuel, lubricants, and sulfuric acid shortages; ore and finished product transportation problems; theft of finished products; debts owed to the state electricity company and state railway company; flooding of open pit mines; and the inability to retain professional and other personnel because of disruptions caused by tribal conflicts and other factors. (*See table 1.*)

By 1994 and continuing into 1995, production of zinc and byproduct cadmium and of columbium-tantalum and monazite had ceased while gold production slowed because of the deteriorating economy and transport infrastructure. Diamond production by MIBA and artisanal miners continued to thrive but reportedly as much as one third or 6 to 7 million carats of national output was smuggled out of the country.¹

The more significant mineral commodities exported from Zaire were cobalt, copper, diamond, gold, and crude oil. Zaire's main trading partners were Belgium, France, Germany, Japan, South Africa, and the United States. Imports by the United States from Zaire consisted mainly of refined copper cathode, gem diamond, and 5.2 million barrels of crude oil.

Zaire's 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 Zaire's copper, cobalt, and coal. Gecamines also operated subsidiaries that produced cement and other materials required for its primary mineral interests. MIBA, which is 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.

Under Gecamines survival plan, cobalt became the company's primary foreign currency earner. Zaire's total cobalt metal production continued to recover from an estimated level of 3,300 metric tons (t) in 1994 to approximately 3,990 t in 1995, of which 546 t were semi-finished white alloy and matte.

Gecamines formerly produced cobalt as a coproduct of its copper operation. Annual production of cobalt had averaged

about 10,000 t since the early 1980's. Rather than flood the market, Gecamines stockpiled refined cobalt and precipitated excess cobalt from its hydrometallurgical plants' cobalt leach circuits as hydrate, which was also stockpiled. By the end of 1995, most of the high-grade cobalt hydrates stocks on hand at Luilu and Shinkolowbe had been reprocessed into cathode. Processing the stockpiled cobalt hydrates reduced company expenses by allowing several mines and concentration plants to be shut down. Gecamines reported completion of an investment of \$130 million to put in a 20-million-cubic-meter-per-year, 15-kilometer (km) conveyor belt extraction system at the Kamoto Oliveira Virgure (KOV) open pit mine at Kolwezi. In addition, a contract was signed by Gecamines with Union Miniere of Belgium and l'Enterprise Generale Malta Forest SPRL to bring the Kasombo cobalt mine into production during 1996 at a rate of 4,500 t of ore yielding between 1,800 and 2,000 t of cobalt oxide.²

Plant tailings and slags also had relatively high cobalt values. The company supplemented the hydrate feed that went to the metallurgical plants by reprocessing concentrator waste and slags and proposed to mine previously bypassed cobalt-rich seams. Improving the recovery yields of the hydrometallurgical plants and the concentrators was also a priority item for the company to allow for future production increases. The OM Group of the United States, a major consumer of refined cobalt, continued its contract to purchase slag from the Gecamines stockpile at Lubumbashi through 1996 and also agreed to purchase 30,000 t of nickel-cobalt concentrates for its Kikkola refinery in Finland.

In late 1995, Gecamines awarded a \$41-million contract to JCI Ltd. of South Africa to upgrade mining equipment and metallurgical facilities. Indications were that Gecamines was making a concerted effort to begin to restore copper production capabilities through modest new investment and through new efforts to seek joint-venture foreign investment participation. Despite the perceived high political risk, the known high grade copper-cobalt resources and basic in-place mining infrastructure should be attractive to some international mining companies.

Gold production from the four formal gold industrial operations (Sominki, Kimin, Okimo, and the Kaparata mines) reportedly rose from 399 kilograms (kg) in 1994 to an estimated 530 kg in 1995.³ Artisanal production is estimated at up to 9,000 kg most of which is not officially documented or legally exported. Zaïre's formal gold output suffered from obsolete equipment and lack of new development work at the mines. Sominki's gold came primarily from the Mobale underground mine at Kamituga, 100 km southwest of Bukavu, which had water problems. The Lubushwa alluvial operation supplied approximately 20% of Sominki's gold production. Sominki was interested in pursuing development of its Twangiza and Tsanda prospects with international partners.

The Kisenge Manganese Company has not done any mining since the late 1970's when the civil war in Angola closed the Benguela railroad, Kisenge's principal export route. At that time, an estimated 1 million t of manganese ore was stockpiled at the mine site. Some ore has been shipped internally to supply a dry cell battery plant, but it is believed that most of the stocks

remain. In October 1995, Kisenge signed a contract with the Benatar Group of South Africa to ship an initial amount of 10,000 to 15,000 t, most likely via the Tazara Railroad to the port at Dar es Salaam, Tanzania. A further shipment of 100,000 t was also discussed which would provide Kisenge with the capital to upgrade its battery plant.⁴

MIBA was the major official diamond producer in Zaïre, accounting for about 40% of official Zairian diamond exports. MIBA is owned 80% by the Government and 20% by the Belgium company Sibeka, in which De Beers has a minority interest. De Beers purchases all of MIBA's industrial diamond output under an exclusive contract. In 1995 MIBA increased its diamond production by 13% over that of 1994 to 4.1 million carats. MIBA installed a new crushing, washing and sorting plant that is expected to help increase production to 6 million carats in 1996.⁵ The industrial grade diamonds in Zaïre have a relatively low unit carat value of around \$15-20, compared to the higher gem-quality diamonds across the border in Angola, which can sell at from \$200 to \$300 per carat. The balance of diamond output was by artisanal workers who have historically accounted for the largest portion of diamond production in Zaïre. Output by artisanal workers was purchased by buyers and/or trading posts locally referred to as "comptoirs." The ratio of gem to industrial diamond recovered by artisanal workers was higher than that for MIBA, but their level of recovery was lower. Estimates of the number of unauthorized miners digging on and around MIBA concessions ranged from 40,000 to 100,000. Their ranks were swelled by Kasai refugees who had fled the ethnic violence in Shaba Province. Illegal miners were also using more mechanical equipment, such as small dredges. In a move to prevent tax evasion, the Government closed 5 of the country's 12 registered comptoirs.

Afridam, Cnead, Comez, Diamco, and Kin-Diamant were closed on December 1994 under a law requiring that private diamond trader's monthly export volumes be worth more than \$1.5 million.

Coal production from the Luena Mine was significantly reduced as a result of ethnic conflicts in Shaba and the reduced demand from Gecamines' plants.

Zaïre Gulf Co., which is controlled by Chevron (United States — 50%), Teikoku Oil (Japan— 32.3%), and Unocal (United States — 17.7%) produced approximately 75% of the nation's petroleum from its 35 offshore wells. Its offshore Tshiala East-1 exploration well was successfully tested at 1,476 barrels per day during 1994, and by 1995, independent estimates indicated that reserves at Tshiala East-1 could reach 80 million barrels, doubling current offshore reserves.⁶ An estimated \$500 million would be required for Chevron to develop the field. Zairep, operated by Petrofina, produces about 6,500 barrels per day from its 83 onshore wells. Overall annual production increased 12% from 1994 to 10.2 million barrels because oil production from the fields near the mouth of the Congo River was relatively isolated from the economic problems, civil unrest, and refugee problems facing the rest of the country.

Zaïre's major mineral resources were generally considered 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. However, reserve data on copper, cobalt, gold and zinc has not been updated for several years and must be reevaluated in light of current economic conditions in Zaire and in light of the deterioration of Gecamines and other facilities. Reserves of oil and gas at yearend 1995 as reported in the 1996 International Petroleum Encyclopedia (page 306) were 187 million barrels of oil and 1.4 billion cubic meters of natural gas.

Zaire is an essentially landlocked country, with only a small coastal area on the Atlantic Ocean. The 2-million-metric-ton-per-year Port of Matadi suffered from abysmal road access to the interior, endemic looting, and an 160-km river approach to the seaport was subject to periodic Angolan rebel attacks.⁷ Falls make the Congo River unnavigable below Kinshasa and limit the world's second largest river as a significant export route.

Zaire utilized a combination of railroad, road, and riverboat transport to move equipment, food, and other supplies into the mining and mineral processing regions and to convey out ores, concentrates, and finished mineral products. Much of this transport network was in varying degrees of disrepair. Locomotive and rolling stock shortages continued to limit the availability of ore at the mills, as well as limiting the quantity of finished products available for export. In an attempt to turn this around, the Government signed a barter agreement during 1994 with South Africa, exchanging coffee and timber for locomotives, railway cars, and spare parts. The Sizarail line was a critical logistical support link for the diamond industry between the Zambian border and Mubuji-Maya.

The major companies involved in transportation are Government owned. Small private trucking and riverboat companies provided limited local service. Mineral products were shipped from the Copperbelt west on the Voie Nationale, a difficult road-rail-water route, to the Matadi seaport, the only transport route entirely within Zaire; through Zambia on the Tazara railroad to the port of Dar es Salaam in Tanzania; as well as 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 railway.

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. Gecamines was also dependent on imported coke and refined petroleum products for its mine and metallurgical operations.

The short-term economic prospects for Zaire were poor. The recent decline of copper and cobalt production had led to the deterioration of the country's most important company, Gecamines. Despite predictions of Gecamines operations coming to a grinding halt owing to its multitude of problems, the company 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. Because of its size and wealth of resources Zaire's long-term potential was more promising, and the country could remain an important supplier of copper, cobalt, and diamond for years. Much of Zaire's future mineral output will hinge on the availability of financing. Zaire's prospects depend on its ability to achieve political and economic stability, mobilize its resources, control Government spending, and attract new foreign investment.

¹Mining Journal. Diamond Smuggling (chart), Aug. 2, 1996, p. 94.

²Yenga, M. Zaire. Mining Annual Review 1996, Mining Journal, London, July, p. 151.

³Work cited in footnote 3.

⁴Work cited in footnote 3.

⁵Work cited in footnote 3.

⁶Africa Energy and Mining Newsletter. Zaire: Output climbs. No. 158, May 24, 1995, p. 3

⁷Journal of Commerce. Zairian Aide Calls Ship Looting "Perilous." V. 400, No. 28, 205, Apr. 15, 1994, p. 12B.

Major Source of Information

Ministere des Mines

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Kinshasa, Zaire

TABLE 1
ZAIRE: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1991	1992	1993	1994	1995
METALS					
Cadmium, smelter	65	84	12	--	--
Cobalt:					
Mine output, Co content	9,900	5,700	2,459	826 r/	1,674
Metal, Co content:					
Refinery (salable products)	8,114	5,049	831	2,329	3,441
White alloy, matte	506	1,580	1,267	945 r/	546
Columbium and tantalum:					
Columbite-tantalite concentrate:					
Gross weight kilograms	57,000	29,000	20,000 e/	4,120	--
Cb content e/ do.	15,000	7,500	5,000	1,000	--
Ta content e/ do.	16,000	8,000	5,700	1,000	--
Pyrochlore concentrate: e/					
Gross weight do.	780,000	780,000	780,000	--	--
Cb content do.	350,000	350,000	350,000	--	--
Copper: 2/					
Mine output:					
By concentration or cementation	60,200 r/	25,100 r/	6,900 r/	7,200 r/	6,800
Leaching (electrowon)	175,100	119,400	39,400	22,800	22,600
Total	235,300	144,500	46,300	30,000	29,400
Metal:					
Smelter, primary:					
Electrowon (low grade)	159,000 r/	110,200 r/	37,100 r/	22,800 r/	22,600
Other	63,900 r/	23,200 r/	5,700 r/	7,200 r/	6,200
Total	222,900 r/	133,400	42,800 r/	30,000 r/	28,800
Refinery, primary:					
Electrowon	16,400 r/	9,600 r/	2,300 r/	-- r/	--
Other	104,200	47,600 r/	34,100 r/	29,000 r/	33,000
Total	120,600 r/	57,200 r/	36,400 r/	29,000 r/	33,000
Gold e/ kilograms	8,800	9,000 r/	8,700 r/	11,100 r/	10,000
Silver e/ do.	58,800 r/	29,500 r/	11,000 r/	900 r/	900
Thorium, monazite concentrate, gross weight e/ (55% rare-earth oxides)	120	50	20	-- r/	--
Tin:					
Mine output, Sn content	1,520	1,020	700 e/	1,000	650
Smelter, primary e/	70	50	50	50	-- e/
Tungsten, mine output, W content	15 e/	--	--	--	--
Zinc:					
Mine output, Zn content	42,400	22,300	6,830	100 r/	--
Metal, primary, electrolytic	28,300	18,800	4,150	--	--
INDUSTRIAL MINERALS					
Cement, hydraulic	250,000 e/	174,000	149,000	50,000 r/ e/	25,000 e/
Diamond:					
Gem thousand carats	3,000 e/	8,930	2,000 r/ e/	3,000 e/	4,000 e/
Industrial do.	14,800 e/	4,570	13,600 e/	13,300 e/	13,000 e/
Total do.	17,800	13,500	15,600	16,300 e/	17,000 e/
Lime e/	82,900 3/	64,600 3/	50,000	50,000	50,000
Stone, crushed e/	360,000	280,000	200,000	200,000	200,000
Sulfur:					
S content of sulfuric acid from sphalerite e/	16,000	11,000	2,000	-- r/	--
Sulfuric acid, gross weight:					
From sphalerite	48,600	33,200	6,000 e/	-- r/	--
From imported sulfur	50,500	36,300	10,000 e/	15,000 r/ e/	--
Total	99,100	69,400	16,000 e/	15,000	--
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous e/	60,000	61,000	14,000 3/	11,000 3/	10,000
Petroleum:					
Crude thousand 42-gallon barrels	9,960	8,687	8,285 r/	9,125 r/	10,220
Refinery products:					
Liquefied petroleum gas do.	4	3	5 r/ e/	5 r/ e/	5 e/
Gasoline do.	375	201	365 r/	365 r/	365 e/
Kerosene and jet fuel do.	468	199	545 r/	545 r/	545 e/
Distillate fuel oil do.	714	317	365 r/	365 r/	365 e/
Residual fuel oil do.	383	193	1,095 r/	1,095 r/	1,095 e/
Refinery fuel and losses do.	111	56	180 r/	545 r/ 4/	545 e/ 4/
Total do.	2,055	969	2,555 r/	2,920 r/	2,920 e/

e/ Estimated. r/ Revised.

1/ Table includes data available through June 21, 1997.

2/ New series. Terms are used as defined by the International Copper Study Group.

3/ Reported figure.

4/ Includes "Other."