

THE MINERAL INDUSTRY OF

ZAIRE

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The decline of Zaïre's mining industry was halted in 1994 as production of copper and cobalt, formerly the foundation of the Nation's foreign currency earnings, rebounded from its precipitous slide. La Générale des Carrières et des Mines (Gécamines) initiated a company "survival program" that minimized its mining operations and concentrated on producing cobalt rather than copper. Cobalt metal output jumped a reported 57% in 1994, compared with 1993, after falling 82% since 1987. Finished copper production increased slightly after declining 90% since 1987.

With the virtual collapse of Zaïre's metal mining sector, diamond exports became Zaïre's most important source of foreign exchange derived from the mineral sector. Historically, the mining industry accounted for 25% of Zaïre's gross domestic product and about three-quarters of total export revenues. However, relatively low production volumes of cobalt and copper continued to depress revenues for Gécamines and minimized the company's financial contribution to the national economy. The national economy was also adversely affected by the massive influx of Rwandian refugees into the country near Goma that impacted the northeast region's gold and columbium production.

Government Policies and Programs

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.

The new Prime Minister, selected by the Parliament in June, pledged to reverse the country's economic decline. Zaïre's hyperinflation subsequently plunged to an estimated annual rate of 6,030% in 1994 from an estimated annual rate of 12,000% in 1993.

Shaba Province's Governor had declared the Province's autonomy from the Nation in December 1993. Calling itself the Katanga Parliament, the provincial parliament announced that it was claiming "concessions and leases on the Province's land, mines, minerals, mineral oils, and hydraulic resources," according to *Africa Energy & Mining*.² Gécamines maintained operations despite complaints that revenue derived locally was being diverted to Kinshasa, the Federal capital, instead of being retained in Shaba.

Production

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; 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 personnel disruptions caused by tribal conflicts. The Shaba Government actively forced the departure of engineers and technicians of Kasai Province origin from Shaba-based Gécamines through May. Nearly 50% of Gécamines staff were harassed to leave Shaba. (*See table 1.*)

The pyrochlore operations of Société Industrielle et Minière du Kivu (Somikivu) at Lueshe, 70 kilometers (km) north of Goma, were discontinued, owing in part to the disruption of its transportation route by the influx of Rwandian refugees.

Trade

The more significant mineral commodities exported from Zaïre were cobalt, copper, diamond, gold, and crude petroleum. In addition to official exports, it was estimated that significant volumes of cobalt, copper, diamonds, and gold were smuggled out of the country.

Zaïre's main trading partners were Belgium, France, Germany, Japan, South Africa, and the United States. Imports by the United States from Zaïre consisted mainly of refined copper cathode, gem diamond, and crude petroleum.

Structure of the Mineral Industry

Zaïre's Government maintained at least part ownership, and generally majority ownership, of nearly all the productive and service sectors of the economy. Gécamines, the principal parastatal company, provided most of Zaïre's copper and all of its cadmium, coal, cobalt, and zinc. Gécamines also operated subsidiaries that produced cement and other materials required for its primary mineral interests. (*See table 2.*)

A number of privatization schemes were suggested for Gécamines to raise money for modernization and make the company more competitive. One proposal suggested that new investments be made in the viable core business and

nonprofitable ancillary operations and that traditional social services be dropped. Another recommendation proposed that the Government sell off all of Gécamines' mining operations and properties and transform the company into a government social service organization funded by royalties paid by private mining operators. Gécamines countered with a proposal to rebuild its aging facilities with international investment.

Commodity Review

Metals

Cobalt.—Under Gécamines survival plan, cobalt became the company's primary foreign currency earner. Zaïre's total cobalt metal production recovered from an estimated level of 2,100 metric tons (mt) in 1993 to approximately 3,300 mt in 1994.

Gécamines formerly produced cobalt as a coproduct of its copper operation. Annual production of cobalt had averaged about 10,000 mt since the early 1980's. Rather than flood the market, Gécamines stockpiled refined cobalt and precipitated excess cobalt from its hydrometallurgical plants' cobalt leach circuits as hydrate, which was also stockpiled. It was estimated that sufficient cobalt hydrates were on hand at Luilu and Shinkolowbe to maintain cobalt production through 1995. Processing the stockpiled cobalt hydrates reduced company expenses by allowing several mines and concentration plants to be shut down.

A severe sulfuric acid shortage limited the company's cobalt production during the first quarter. New cobalt sales allowed Gécamines to obtain acid, fuel, lubricants, and spare parts necessary to boost production in 1994.

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.³ 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.

A new 20-million-cubic-meter-per-year, 15-km conveyor belt system was installed at the Kamoto Oliveira Virgure (KOV) open pit mine in Kolwezi. The system should significantly reduce Gécamines' fuel cost associated with moving the overburden and ore from the pit. A crushing plant was also installed.

The OM Group renewed its contract to purchase cobalt slag from Gécamines' stockpile at Lubumbashi through 1996. The OM Group had treated the slag at its facilities in Kokkola, Finland since 1993. The contract to send cobalt to China, which provided funding for Gécamines' acid and fuel purchases during early 1994, was expected to run through 1995.

Zairian high-grade electro output contained 99.9% cobalt, whereas granules traditionally contained about 99.5% cobalt. During the year, both the Shituru and Luilu Refineries were,

at times, reportedly producing granules containing less than 80% cobalt. Previously, such low-quality material was dumped and eventually sold through South Africa.

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 Gécamines.

Copper.—Despite numerous difficulties, including reduced production from the Kamoto underground mine, which suffered a major cave-in in September 1990, Gécamines' copper production increased slightly. Most of the copper ore was produced in 1994 by the Kamoto underground mine and the Kamoto open pit. The Lubumbashi smelter remained closed. The new Luilu electrorefining facility continued to have startup problems.

Gold.—Gold was produced by medium-sized companies and by artisanal miners. The former included Société Minière du Kivu (Sominki) and the Office des Mines d'Or de Kilomoto (Okimo). It was not possible to estimate the quantity of artisanal production, most of which was smuggled across the eastern and northeastern borders. 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. Okimo slowly resumed operations after Government soldiers, originally called in during a 1992 strike, were finally removed from several of Okimo's production sites where they had been intimidating miners.

Sominki was interested in pursuing development of its Twangiza & Tsanda prospects with international partners. Taylor Rand Co. of the United States was negotiating for an interest in two producing gold properties with the Zairian company, Mbula SPRL.

Tin.—Tin production and exports increased in 1994. The ability of Sominki to export its concentrates was enhanced by improvements in local rail transportation.

Zinc.—Electrolytic zinc metal production fell from 4,150 mt in 1993 to an estimated zero metric tons in 1994. Gécamines' Kolwezi plant's cadmium and zinc were co-products of ore from the Kipushi Mine, west of Lubumbashi. The flooded Kipushi Mine remained closed during 1994, thus limiting the supply of available ore.

Industrial Minerals

The Société Minière de Bakwanga (MIBA) was the major official diamond producer in Zaïre, accounting for about 40% of official Zairian diamond exports. MIBA sold its predominately industrial diamond output to a subsidiary of

the De Beers Consolidated Mines group. 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 known 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 using more mechanical equipment, such as small dredges.

Two-thirds of the Nation's diamond production was allegedly smuggled out through under-invoicing of legally recorded diamonds on the way to the principal diamond cutting center in Antwerp, Belgium. An undocumented volume of stones also was smuggled in from Angola and exported as Zairian. According to *Africa Energy and Mining*, Belgium imported approximately \$577 million worth of diamonds from Zaïre in 1994, up from \$335 million in 1993. The increase was attributed to escalating shipments of Angolese diamonds through October, when the Angolan Government regained control of the rebel-held diamond producing areas of Lunda Norte.

In a move to prevent tax evasion, the Government closed 5 of the country's 12 registered comptoirs. Afridam, Diamco, Comez, Cnead, and Kin-Diamant were closed on December 31 under a law requiring that private diamond traders monthly export volumes be worth more than \$1.5 million.

Mineral Fuels

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

Zaïre Gulf Co. produced approximately 75% of the Nation's petroleum from 35 offshore wells. Its Tshiala East-1 exploration well was successfully tested at 1,476 barrels per day during 1994. Zairep operated 84 wells onshore. Zairep had undertaken a significant workover program during the year.

Reserves

Zaïre's major mineral reserves were considered sufficient for many years of production, although reserves of high-grade ores are limited. However, inadequate financing for transportation, mine development, and maintenance of mining operations should inevitably extend the life of the reserves as an artifact of reduced levels of exploitation.

Infrastructure

Zaïre was 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 the 160-km river approach to the seaport was subject to periodic Angolan rebel attacks.⁴

Zaïre 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 major companies involved in transportation were Government-owned. Small private trucking and riverboat companies provided limited local service. Mineral products were shipped on the Voie Nationale to the Matadi seaport, the only transport route entirely within Zaïre, as well as to Dar es Salaam in Tanzania and to ports in South Africa. Copper shipments could take 45 days to move from the plant to the dock, either south via Zambia and Zimbabwe or eastward along the Tanzania-Zambia 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 diamonds and gold were flown out of the country.

Shaba, 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 Inga-Shaba transmission line. Gécamines was also dependent on imported coke and refined petroleum products for its mine and metallurgical operations.

Outlook

The short-term economic prospects for Zaïre were poor. The recent decline of copper and cobalt production had led to the deterioration of the country's most important company, Gécamines. Despite predictions of Gécamines operations coming to a grinding halt owing to its multitude of problems, the company continued to operate, albeit at limited capacity.

Demand for U.S. mining and materials handling equipment is expected to resume in the long run. Gécamines had bought heavily from U.S. suppliers but is currently having difficulty paying its debts. The MIBA diamond mines and Kilomoto gold mines are also good potential customers.

Because of its size and wealth of resources, Zaïre's long-term potential was more promising, and the country could remain an important supplier of copper, cobalt, and diamond for years. Much of Zaïre's future mineral output will hinge on the availability of financing. Zaïre's prospects depend on its ability to achieve political and economic stability, mobilize its resources, control Government spending, and renew

multilateral and bilateral aid programs.

¹Text prepared July 1995.

²Africa Energy & Mining. Katanga Power Grab. No. 129, Mar. 2, 1994, p. 8.

³Metal Bulletin. Confusion Over Gécamines Plans. No. 7879, May 12, 1994, p. 12.

⁴Journal of Commerce. Zairian Aide Calls Ship Looting "Perilous." V. 400, No. 28,205, Apr. 15, 1994, p. 12B.

Major Sources of Information

Département de l'Economie Nationale et de l'Industrie
Kinshasa, Zaïre

TABLE 1
ZAIRE: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1990	1991	1992	1993	1994 e/
METALS					
Cadmium, smelter	127	65	84	12	--
Cobalt:					
Mine output:					
Ore milled:					
Gross weight thousand tons	11,900	8,420	5,640	1,850 e/	1,000
Co content	39,500	20,900	13,300	5,060 e/	3,000
Concentrate produced:					
Gross weight thousand tons	1,290	902	631	208 e/	100
Co content	19,000	9,900	5,700	2,460 e/	1,500
Refinery input, Co content:					
Concentrate e/	19,000	9,900	5,700	2,460	1,000
Hydrates	3,190	5,480	4,100	1,000 e/	5,500
Scrap	49	517	1,110	180 e/	200
Total e/	22,200	15,900	10,900	3,640	6,700
Metal, Co content: 3/					
Luflu cathodes	3,470	2,990	2,630	107 e/	100
Shituru refinery:					
Cathodes	3,120	2,440	1,840	263 e/	300
Granules 4/	3,360	2,690	583	461 e/	1,800
White alloy, matte	34	506	1,580	1,270 e/	1,100
Total 5/	9,980	8,620	6,630	2,100 e/	3,300
Columbium and tantalum:					
Columbite-tantalite concentrate:					
Gross weight kilograms	35,800 r/	57,000	29,000	20,000 e/	4,120 6/
Cb content e/ do.	9,100 r/	15,000	7,500	5,000	1,000
Ta content e/ do.	10,000	16,000	8,000	5,700	1,000
Pyrochlore concentrate: e/					
Gross weight do.	780,000 r/	780,000 r/	780,000 r/	780,000 r/	--
Cb content do.	350,000 r/	350,000 r/	350,000 r/	350,000 r/	--
Copper:					
Mine output: 7/					
Ore mined:					
Gross weight: thousand tons	12,900	8,620	7,450	1,350 e/	1,350
Cu content: do.	509	310	275	56	55
Concentrate:					
Gross weight: do.	1,440	1,020	654	195 e/	195
Cu content: do.	413	265	168	49	50
Metal:					
Intermediate products:					
Electrowon cathode	229,000	180,000 e/	111,000 r/	33,000 e/	39,700
Smelter: 8/					
Black copper	9,500	5,000 e/	2,000 e/	300	300
Blister	117,000	52,500	19,900	7,000	8,000
Total	356,000	238,000 e/	133,000 r/ e/	40,300 e/	48,000
Finished products: 3/					
Blister	117,000	52,500	19,900	7,000 e/	8,000
Electrowon cathode 9/	80,600	65,600	67,200	5,240 e/	5,000
Refined, wirebar	141,000	104,000	47,500	31,100 e/	33,300
Other	--	--	539	1,950 e/	2,000
Total	339,000	222,000	135,000	45,300 e/	48,300
Gold e/ kilograms	9,300	8,800	7,000	6,000	6,000
Silver e/ do.	84,000	80,000	60,000	50,000	50,000
Thorium, Monazite concentrate, gross weight (e/ 55% rare earth oxides)	124	120 e/	50 e/	20 r/ e/	20
Tin:					
Mine output, Sn content	2,220	1,520	1,020	700 e/	1,000 6/
Smelter, primary e/	90	70	50	50	50
Tungsten, mine output, W content	17	15 e/	--	--	--
Zinc:					
Mine output:					
Ore milled:					
Gross weight thousand tons	1,340	1,040	619	146 r/	10
Metal content	115,000	81,400	45,900	13,300 r/	800

See footnotes at end of table.

TABLE 1-Continued.
ZAIRE: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1990	1991	1992	1993	1994 e/	
METALS--Continued						
Zinc--Continued:						
Concentrate:						
Gross weight	145,000	99,300	53,600	13,900 r/	800	
Metal content	61,800	42,400	22,300	6,830 r/	300	
Metal, primary, electrolytic	38,200	28,300	18,800	4,150 r/	--	
INDUSTRIAL MINERALS						
Cement, hydraulic	461,000	250,000 e/	174,000	149,000	150,000	
Diamond:						
Gem	thousand carats	2,910	3,000 e/	8,930	2,010 e/	3,000
Industrial	do.	16,500	14,800 e/	4,570	13,600 e/	13,300
Total	do.	19,400	17,800	13,500	15,600	16,300
Lime		92,000	82,900	64,600	50,000 e/	50,000
Stone, crushed e/		450,000	360,000	280,000	200,000	200,000
Sulfur:						
Byproduct of metallurgy, S content of sulfuric acid from sphalerite e/		23,500	16,000	11,000	2,000	1,000
Sulfuric acid, gross weight:						
From sphalerite		70,700	48,600	33,200	6,000 e/	3,000
From imported sulfur		61,400	50,500	36,300	10,000 e/	12,000
Total		132,000	99,100	69,400	16,000 e/	15,000 6/
MINERAL FUELS AND RELATED MATERIALS						
Coal, bituminous e/	thousand tons	100	60	61	14 6/	11 6/
Petroleum:						
Crude	thousand 42-gallon barrels	10,600	9,960	8,700	8,310	10,600
Refinery products:						
Liquefied petroleum gas	do.	4	4	3	4 e/	4
Gasoline	do.	687	375	201	350 e/	350
Kerosene and jet fuel	do.	756	468	199	500 e/	500
Distillate fuel oil	do.	1,540	714	317	700 e/	700
Residual fuel oil	do.	1,180	383	193	350 e/	350
Refinery fuel and losses	do.	150	111	56	96 e/	96
Total	do.	4,320	2,060	969	2,000 e/	2,000

e/ Estimated. r/ Revised.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to the totals shown.

2/ Table includes data available through July 21, 1995.

3/ Products shown are primarily salable products.

4/ Granules are produced from cathode produced primarily at Shituru and are not double counted.

5/ In the U.S. Bureau of Mines Cobalt World Refinery Production Table, the refinery production of cobalt in Zaire excludes white alloy and matte, which require further processing.

6/ Reported figure.

7/ In the U.S. Bureau of Mines Copper World Mine Production Table, the mine production of copper in Zaire is the sum of (1) blister, black copper, and Sodimiza concentrate copper content (by concentration or cementation), and (2) electrowon cathode (by leaching).

8/ In the U.S. Bureau of Mines Copper World Smelter Production Table, the smelter production of copper in Zaire is the sum of blister, black copper, and electrowon cathode.

9/ Includes the portion of electrowon cathode that is exportable for further processing. This may include high-purity cathode.

TABLE 2
ZAIRE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cobalt		Générale des Carrières et des Mines du Zaïre (Government, 100%)	Shituru Plant at Likasi	8,000
Do.		do.	Luilu Plant at Kolwezi	9,000
Columbium-tantalum:				
Concentrate		Société Minière et Industrielle de Kivu (Sominki) (Lencourt Ltd., 71.7%; Government, 28.3%)	Northern Kivu region	60
Pyrochlore concentrate		Société Minière du Kivu (Gesellschaft für Elektro-metallurgie, GmbH, Germany, 70%; Government, 20%; Sominki, 10%)	Lueshe, 70 kilometers north of Goma	1,000 1/
Copper		Générale des Carrières et des Mines du Zaïre (Government, 100%)	Lubumbashi Smelter	150,000 1/
Do.		do.	Shituru Smelter at Likasi	140,000
Do.		do.	Shituru Refinery at Likasi	200,000
Do.		do.	Luilu Smelter at Kolwezi	175,000
Do.		do.	Luilu Refinery at Kolwezi	20,000
Do.		do.	Panda Electric Furnace at Likasi	10,000
Diamond	thousand carats	Société Minière de Bakwanga (Government, 80%; Sibeka, 20%)	Mbuji Mayi	9,200
Do.	do.	Artisanal miners (private, 100%)	Tshikapa	15,000
Gold	kilograms	Société Minière et Industrielle de Kivu (Sominki) (Lencourt Ltd., 71.7%; Government, 28.3%)	Eastern Zaïre	3,000 e/
Do.	do.	Office des Mines d'Or de Kilomoto (Okimo) (Government, 100%)	do.	3,000 e/
Do.	do.	Artisanal miners (private, 100%)	Eastern and north-eastern Zaïre	4,000 e/
Petroleum	thousand 42-gallon barrels	Zaire Gulf Oil Company (Chevron Overseas Petroleum Inc., 50%; Teikoku Oil Co., 32.28%; and Unocal International Corp., 17.72%)	Offshore	8,030
Do.	do.	Zairep (Petrofina, 100%)	Onshore	2,400
Tin, concentrate		Société Minière et Industrielle de Kivu (Sominki) (Lencourt Ltd., 71.7%; Government, 28.3%)	Kalima, Kindu	2,400
Zinc:				
Concentrate		Générale des Carrières et des Mines du Zaïre (Government, 100%)	Kipushi Mine	85,000 1/
Refined		do.	Kolwezi Plant	75,000 1/

e/ Estimated.

1/ Temporarily shut down.