THE MINERAL INDUSTRY OF

ZIMBABWE

By Philip M. Mobbs

The mineral industry of Zimbabwe was a major contributor to the world supply of chrysotile asbestos, ferrochromium, and lithium minerals. The nation's mineral industry was diverse, with a nucleus of asbestos, coal, chromite, copper, diamond, gold, granite, and nickel operations. It accounted for about 8% of the nation's gross domestic product. Gold production was the country's leading mineral sector in 1996 with output exceeding 24 metric tons and a value of \$280 million. Intense diamond exploration activity continued throughout the country during the year.

All mining activities came under the Mines and Minerals Act (Chapter 165) (1961), its amendments, and associated regulations. All mineral rights were vested in the state through the President of Zimbabwe. Security of tenure was assured by the law. Corporate tax levels were 37.5%, and the individual rate was 40%. Buildings, equipment, shaft sinking, and premining development could be expensed at 100% in the year of the expenditure.

The Zimbabwe Investment Center assisted investors with permits and licenses and sanctioned investment projects. The Gold Trade Act gave the Reserve Bank of Zimbabwe the monopoly on purchasing and exporting all gold produced in Zimbabwe. In October, the Reserve Bank changed its gold payment policy and began paying producers the value of refined gold in U.S. dollars rather than the assayed value of delivered doré in Zimbabwe dollars. The Minerals Marketing Corp. Zimbabwe handled most other mineral exports.

Under the provisions of the Mines and Minerals Act, the Ministry of Mines was responsible for verifying that exploration and development operations have minimal long-term environmental impact. The Ministry of Lands, Agriculture, and Water Development monitored water pollution under the Water Act (1976), as did the Ministry of Environment and Tourism's Department of Natural Resources under the Natural Resources Amendment Act (1975). The Ministry of Health was responsible for air quality under the Atmospheric Pollution Prevention Act (1971).

Most of the country's mineral industries were export-oriented and subject to world market fluctuations. Many minerals were processed prior to export in accordance with the Government's strategy of increasing value-added natural-resource exports. For 1996, mineral exports increased 13% in terms of Zimbabwe dollars (Chamber of Mines Journal, 1997b), in U.S. dollar terms, however, exports were valued at about \$707 million,¹

which was down from \$731 million in 1995. Mineral commodities exported in 1996 included gold, high-carbon ferrochrome (\$138 million), asbestos (\$70 million), nickel (\$69 million), low-carbon ferrochrome (\$48 million), ferrosilicon chrome (\$18 million), black granite (dimension stone) (\$17 million), copper (\$16 million), diamond (\$8 million), coke (\$8 million), steel (\$6 million), graphite (\$3 million), platinum-group metals (PGM) (\$3 million), lithium minerals (\$3 million), emeralds (\$2 million), and coal (\$2 million). Mineral exports accounted for about 45% of Zimbabwe's foreign currency earnings.

Exclusive prospecting orders (EPO's) were renewable 3-year rights to search for specified minerals in a given geographic location issued by the Ministry of Mines. More than half of the 226 EPO's in effect had been issued for diamond only, Additionally, 43 EPO's were for diamond and gold, and 26 were for gold only. At yearend, about 160 applications for EPO's were being reviewed.

Zimbabwe had a significant local mining industry. More than 500 gold mining operations were registered, many of which were small scale (S.T. Mombeshora, Minister of Mines of Zimbabwe, unpublished data, 1997). Multinationals, such as Anglo American Corporation Zimbabwe Ltd., Falcon Gold Zimbabwe Ltd., Lonrho Zimbabwe Ltd., Rio Tinto Zimbabwe Ltd. (RTZ), and Union Carbide Zimbabwe Ltd., historically have dominated the nation's mining industry. A number of American, Australian, Canadian, European, and South African mining companies were exploring, primarily in the diamond and gold sectors. The Government was pursuing an indigenization policy to increase black Zimbabwean's equity interest in economic multinational mining operations (Indian Ocean Newsletter, 1996).

The state-owned mining company, Zimbabwe Mining Development Corp. (ZMDC), had an interest in a number of mining operations. Refractory ores containing gold were treated at the Government-owned Roasting Plant in Kwekwe. The Government's Industrial Development Corp. of Zimbabwe Ltd. had several subsidiary companies operating in the industrial mineral sector. Mineral exports were usually shipped out of the country aboard the state-owned National Railways of Zimbabwe.

Approximately 45,000 people were employed in mediumand large-scale mining operations, and an estimated 10,000 people worked the nation's smaller mines. Between 100,000 and 300,000 people were estimated to be involved intermittently in informal gold panning. Heavy rains at the beginning of the year adversely affected production for some mineral extration

¹Where necessary, values have been converted from Zimbabwe dollars to U.S. dollars at the yearend rate of Z\$10.9=US\$1.00 for 1996 and Z\$9.3=

operations. During 1996, 48 fatal mining accidents were reported nationwide compared with 74 during 1995 (Chamber of Mines Journal, 1997a).

Mhangura Copper Mines Ltd. continued to operate despite financial difficulties. Lomagundi Smelting and Mining (Private) Ltd. curtailed mining at the Shackleton copper mine during September. Munyati Mining Co. Ltd., the operations company owned by Reunion Mining PLC of the United Kingdom and ZMDC, mined copper oxide ore at Sanyati. Startup problems in the leach operation resulted in less-than-expected production during the mine's first year of operation (Reunion Mining PLC, 1997). Reunion obtained funding for the CoZiMa Project, the evaluation of cobalt, manganese, and zinc recovery from the Sanyati leachate from the European Investment Bank.

The ferrochrome slag reprocessing plant at the Kwekwe smelter of Zimbabwe Mining and Smelting Co. (Pvt.) Ltd. (Zimasco) came onstream in August. Zimbabwe Alloys Ltd. (Zimalloys) began open-pit mining of chromite at the Airstrip Mine near the Inyala Mine. The 1995 joint venture between low-carbon ferrochrome producer Zimalloys; Japan Metals & Chemicals Co., a Japanese ferroalloy manufacturer; and Mitsui & Co., Ltd., a Japanese trading company, led to the ferrochrome furnace at the Gweru smelter being reengineered and recommissioned in August. After the month-long refurbishment, the ferrochrome furnace proceeded to break plant production records (Zimbabwe Alloys Ltd., 1997).

The largest gold mine in Zimbabwe, the Freda Rebecca Mine, producing at the rate of 2.5-metric-ton-per-year (t/yr) of contained gold, changed hands when Ashanti Goldfields Co. Ltd. of Ghana acquired Cluff Resources Zimbabwe Ltd. The operation included the Rebecca underground mine and the Freda open pit. Ashanti installed a new crushing circuit and planned to expand the treatment plant.

Most of the new gold operations were based on the application of heap-leach technology to old operations or consolidating adjacent, discrete, and small ore bodies into one operation. Although the large mines of Ashanti, Falcon Gold, Lonrho, and RTZ dominated the gold sector, the numerous medium- and small-scale producers contributed about 10% to the nation's gold production. Alluvial gold panning was Zimbabwe's rural alternative to subsistence farming. The Mining (Alluvial Gold) (Public Streams) Regulations (1991) authorized selective alluvial gold mining, but extensive riverbank erosion and stream siltation resulted from significant unauthorized mining activity. The National Miners Association of Zimbabwe (formerly the Small-Scale Miners Association) was attempting to inform the gold panners of potential environmental problems resulting from unauthorized operations.

A number of companies continued gold exploration programs, including Antares Mining and Exploration Corp. of Canada, Ashanti, Forbes and Thompson Ltd. of Zimbabwe, Casmyn Corp. of the United States, International Ballater Resources Inc. of Australia, Oliver Gold Corp. of Canada, Reunion, and Trillion Resources Ltd. of Canada.

Zimbabwe Iron and Steel Co. (Pvt.) Ltd.'s (Zisco) blast furnace No. 4 remained shut down during 1996. Shougang International of China had received the latest contract to refurbish the furnace. Steel production was from the smaller

blast furnace No. 3. Zisco had a steel ladle furnace installed and at yearend, the Government proposed to partially divest its interest in Zisco. Steelmakers Ltd. of Kenya proposed to build a rolling mill and a stainless steel plant near Zisco's Redcliff operations.

The continued problems at Zisco's furnace No. 4 resulted in the underutilization of the production capacities of Buchwa Iron Mining Co.'s (BIMCO) new Ripple Creek iron ore mine and at the closing Buchwa iron ore mine. Negotiations began at yearend for BIMCO to supply iron ore to the Beira Iron Project, a proposed hot briquetted iron plant to be erected near the Zimbabwe-Mozambique border.

A Memorandum of Understanding was signed in August allowing the Government to purchase shares in Anglo American Corp. Zimbabwe Ltd. (AMZIM). AMZIM controlled the operations of Bindura Nickel Corp. Ltd.

Zimasco was mining about 240,000 t/yr of PGM ore at its Mimosa Mine near Zvishavane. Platinum-bearing concentrate from the mine was toll smelted in South Africa. BHP Minerals Zimbabwe, a subsidiary of Broken Hill Proprietary Co. Ltd. of Australia (67%) and Delta Gold NL of Australia (33%), stockpiled PGM ore from the \$360 million Hartley Mine. Formal commissioning of the mine was postponed until 1997. Unstable ground at the south portal resulted in production stoping beginning at a depth of about 150 meters (m) from the surface instead of the proposed depth of 100 m. The on-site metallurgical plant was designed to process 2.16 million metric tons per year of ore. By November, the mill and the flotation plant were completed.

Additional platinum projects in Zimbabwe being evaluated along the Great Dyke included Delta's 100%-owned Selous platinum prospect, located just south of the Hartley Complex; the Mhondoro Platinum Joint Venture (Delta, 38.7%, and Valley Exploration and Mining Co., a subsidiary of BHP Minerals Zimbabwe, 61.3%), south of Selous; and Delta's Ngezi prospect. Also under exploration were Anglo American's Unki prospect near Shurugwe and the Snakes Head platinum prospect on the northern end of the Great Dyke by the Zimbabwe Geological Survey and the Metal Mining Agency of Japan.

Africa Resources Ltd. of Zimbabwe acquired African Associated Mines from T&N PLC of the United Kingdom. African Associated Mines operated the Shabanie and the Gaths asbestos mines

During 1996, the Wankie Colliery agreed to lease Zisco's coke oven batteries. Wankie also brought its coke oven gas project on-stream. Wankie's coal production remained constrained by lack of local demand. Production was expected to increase in 1997 when the Hwange coal-fired powerplant's expansion was completed. RTZ resuscitated plans to develop Sengwa coal field to supply a proposed mine-mouth powerplant.

United Portland Cement Ltd. installed new limestone crushers and blending beds at its Colleen Bawn works. Sino-Zimbabwean Cement Co., a joint venture of the Industrial Development Corp. of Zimbabwe and the China Building Material Industrial Cooperation of China, began construction of a 250,000-t/yr-capacity cement plant at Indiva, near Gweru.

About 90% of the country was under EPO's for diamond and

at various stages of exploration. River Ranch Mine, a joint venture of Redaurum Red Lake Mines Ltd. of Canada and Auridiam Consolidated NL of Australia, was the nation's only active diamond mine. Trillion Resources Ltd. of Canada and Nickelodeon Minerals Inc. of Canada erected a bulk sampling plant on their Sansukwe joint-venture diamond prospect.

Bikita Minerals (Pvt.) Ltd., received certification as an ISO 9002 supplier of lithium minerals. G&W Industrial Minerals (Pvt.) Ltd. acquired the muscovite mines in the Mwami area from Technical Minerals (Pvt.) Ltd.

Most of Zimbabwe's bulk commodities were moved by rail. All major cities and industrial centers were linked to Botswana, Mozambique, South Africa, and Zambia by the National Railways of Zimbabwe's 2,745 kilometers (km) of track. Petroleum products destined for Zimbabwe were piped to Feruka, near Mutare, via the Beira pipeline through Mozambique and then moved west via the Mutare-Harare pipeline or trucked. Zimbabwe had an 85,784-km road network. Zimbabwe was part of the embryonic southern African electrical power pool.

Asbestos, coal, ferroalloys, gold, and nickel were expected to remain the mainstays of the Zimbabwean mineral economy through the turn of the century. The national economic significance of copper, diamonds, granite, and PGM was expected to increase. The continued high cost of domestic capital, potential negative international perception of governmental actions, and any downturn in international metal prices could adversely affect the industry in the short term. Updated investment regulations, the nation's well-developed and well-maintained infrastructure, new exploration techniques, and accessible mineral resources were expected to encourage further local and foreign participation in the mineral industry.

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Major Sources of Information

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TABLE 1 ZIMBABWE: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity METALS		1992	1993	1994	1995	1996
Antimony, mine output, concentrate, Sb content	254	95	65	37 r/	5	
Beryllium, beryl concentrate, gross weight		23	23	4	4 e/	4 e/
Chromium, chromite, gross weight	thousand tons	522	252	517	707 r/	697
Cobalt: 2/						
Mine output, Co content e/		80	90	100	80	95
Metal (hydroxide)		100	113	126	109 r/	110
Columbium and tantalum, tantalite concentrate, gr	oss weight	94	48	7	1 e/	e/
Copper: Mine output, concentrate, Cu content e/	thousand tons	10	9	9	9	10
Metal:						
Smelter output, blister/anode, primary e/		9,690	8,200	10,000	8,000	7,600
Refinery output, refined/cathode, primary Gold	leila anoma	9,673 18,278	8,187 18,916	9,350 20,512	6,875 23,959	10,900 24,699
Iron and steel:	kilograms	10,270	16,910	20,312	23,939	24,099
Mine output, iron ore:						
Gross weight	thousand tons	1,179	375	4	311	324
Fe content e/	do.	710	225	3	160	160
Metal:			-	-		
Pig iron e/	do.	507	211	100	209 3/	210
Steel, crude	do.	547	221	187	210	212
Ferroalloys:						
Ferrochromium	do.	191	124	183	254	230
Ferrosilicon chromium	do.	20	30	36	47	51
Ferromanganese			2,151			
Nickel:		12 270 /	12.760 /	12.026	11.701 /	11.561
Mine output, concentrate, Ni content Refinery output, refined metal 4/		12,378 r/ 10,349	12,769 r/ 11,097	13,836 r/ 13,516	11,721 r/ 10,864 r/	9,694
Platinum-group metals:		10,349	11,097	13,316	10,864 1/	9,694
Palladium	kilograms	19	11	17	20 r/e/	120 e/
Platinum	do.	9	4	7	10 r/e/	100 e/
Selenium	do.	1,736	1,113	2,009	2,000 e/	2,000 e/
Silver	do.	16,930	12,004	10,942	15,640 r/	9,982
Tin:			,	<u> </u>	<u> </u>	
Mine output, Sn content e/		950	800	100	10 r/	10 e/
Smelter output, metal		716	657	82		
INDUSTRIAL MINERALS						
Asbestos	thousand tons	150	157	152	169	165
Barite		232	120			e/
Cement, hydraulic e/	thousand tons	900	1,000	1,070 r/	1,100	1,150
Clays:		92.056	112.470/	1.60.007	1.60.922/	105.052
Bentonite (montmorillonite) Fire clay		82,956 15,954	113,470 r/ 9,257	169,097 13.997	169,823 r/ 12,743 r/	185,953 14,479
Kaolin		83	9,237	462	57 r/	14,479
Diamond	carats	40,654	43,850	173,588	204,416 r/	437,266
Emerald	kilograms	46	635	276	2,209 r/	1,080
Feldspar	B	2,696	1,553	1,617	3,920 r/	3,248
Graphite		12,346	7,142	7,890	11,381	7,691
Kyanite		1,990	878 r/	567	875 r/	141
Lithium minerals, gross weight		12,837	18,064	25,279	33,498 r/	30,929
Magnesite		8,973	6,276	1,588	5,597 r/	10,659
Mica		495	510	213	1,040 r/	1,500
Nitrogen, N content of ammonia e/		67,000	70,000	70,000	70,000	70,000
Phosphate rock, marketable concentrate	thousand tons	142	153	151	154 r/	123
Pigments, iron oxide		538	390	438	400	400 e/
Stone, sand and gravel:		00.604	40.022	106 605	101 605/	100.269
Granite Limestone	thousand to	90,694	40,032	106,605	121,685 r/	109,268
Ouartz 5/	thousand tons do.	1,366 77	1,036	1,658 131	1,499 r/ 172 r/	1,425 96
Quartz 5/ Sulfur	do.	11	01	131	1/2 [/	90
Pyrite:						
Gross weight		66,345	72,588	71,026	70,706	59,831
S content e/		29,200	32,000 r/	31,000 r/	31,000 r/	26,000
Byproduct acid, metallurgical and coal process	gas e/	4,500	4,000	4,500	4,500	5,000
Talc	<u> </u>	2,203	1,349	2,049	2,080 r/	1,076
Vermiculite		4,300	5,032	8,184	13,742 r/	10,249
See, footnotes at end of table						*

See footnotes at end of table.

TABLE 1--Continued ZIMBABWE: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1992	1993	1994	1995	1996
MINERAL FUELS AND RELA	TED MATERIALS					
Coal, bituminous	thousand tons	5,547	5,285	5,515	5,538 r/	5,175
Coke, metallurgical e/	do.	500	200 r/	300 r/	300 r/	400

e/ Estimated. r/ Revised.

- 4/ May include nickel content of nickel oxide.
- 5/ Includes rough and ground quartz as well as silica sand.

TABLE 2 ZIMBABWE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

		Major operating companies		Annual
Commodity		and major equity owners	Location of main facilities	capacity
Asbestos		Shabanie and Mashaba Mines (Pvt.) Ltd. [African Associated Mines (Pvt.) Ltd., 100%]	Shabanie Mine, Zvishavane; Gaths and King Mines, Mashava	300
Chromite, gross weight		Zimbabwe Mining and Smelting Co. (Pvt.) Ltd. (Zimasco) (Zimasco Consolidated Enterprises, 100%)	Peak Mine and Railway Block Mine at Shurugui and mines at Mutorshanga and Lalapanzi	500
Do.		Zimbabwe Alloys Ltd. (Zimalloys) (Anglo American Corp., 100%)	Great Dyke Mine, Mutoroshanga; Netherburn Mine at Lalapanzi; and Inyala Mine at Mberengwa	50
Do.		Local Co-operatives	North Dyke	50
Coal		Wankie Colliery Co. (Pvt.) Ltd. (private investors, 60%, Government, 40%)	Hwange	5,500
Cobalt	tons	Bindura Nickel Corp. Ltd. (Anglo American Corp., 100%)	Shangani Mine, northwest of Shangani; Madziwa Mine, 50 kilometers northeast of Bindura; Trojan Mine, Bindura; Epoch Mine, Filabusi	150
Copper		Mhangura Copper Mines Ltd. (Zimbabwe Mining Development Corp., 55%)	Mhangura	16
Do.		Munyati Mining Ltd. Co. (Reunion Mining PLC, 75%; Zimbabwe Mining Development Corp., 25%)	Sanyati Mine, Sanyati	5
Do.		Lomagundi Smelting & Mining (Pvt.) Ltd. (Merits Ltd., 100%)	Smelter at Alaska	35
Do.		do.	Refinery at Alaska	28
Diamond	carats	Auridam Zimbabwe (Pvt.) Ltd. (Auridam Consolidated NL, 50%; Redaurum Red Lake Mines Ltd., 50%)	River Ranch Mine, near Beitbridge	440,000
Gold	kilograms	Rio Tinto Zimbabwe Ltd. (RTZ Corp. PLC, 56%)	Renco Mine, 75 kilometers southeast of Masvingo; Patchway Mine, Kadoma; Brompton Mine, Kadoma; and Cam and Motor dump, Kadoma	2,800
Do.	do.	Ashanti Goldfields Zimbabwe (Pvt.) Ltd. (Ashanti Goldfields Co. Ltd., 82.4%, private investors, 17.6%)	Freda Rebecca Mine, Bindura	2,500
Do.	do.	Independence Mining (Pvt.) Ltd. (Lonhro PLC, 100%)	How Mine, Bulawayo; Athens Mine, Mvuma; Tiger Reef Mine, Kwekwe; Redwing Mine, Penhalonga; Shamva Mine, Shamva; Legion Dump, Kezi	3,300
Do.	do.	Falcon Gold Zimbabwe Ltd. (Falcon Investments S.A., 71.7%)	Dalny Mine, Chegutu; Venice Mine, Kadoma; Golden Quarry Mine, Shurugui; Old Nic Mine, Bulawayo	2,000
Do.	do.	Corsyn Consolidated Mines (Pvt.) Ltd. (Lonrho PLC, 100%)	Anzac Mine, Kwekwe; Arcturus Mine, Arcturus; Mazowe Mine, Mazowe; Muriel Mine, Mutorashanga	1,500
Do.	do.	Zimbabwe Mining Development Corp. (Government, 100%)	Lexington Mine and Elvington Gold Mine, near Chegutu	1,000
Do.	do.	Jena Mines (Pvt.) Ltd. [Zimbabwe Mining Development Corp., 50%; Trillion Resources (Pvt.) Ltd. Zimbabwe, 50%]	Jena Group, Kwekwe area	400
Do.	do.	Casmyn Mining Zimbabwe (Pvt.) Ltd.	Turk Mine, north of Bulawayo	150
Iron and steel:				
Crude steel		Zimbabwe Iron and Steel Co. (Pvt.) Ltd. (Government, 92%)	Redcliff, near Gweru	220 1/
Iron ore, gross weight		Buchwa Iron Mining Co. [Zimbabwe Iron and Steel Co. (Pvt.) Ltd., 100%]	Buchwa West Mine, Buchwa; Ripple Creek Mine, near Redcliff	1,400

^{1/}Table includes data available through Feb. 14, 1998.
2/ "Mine output" figures are estimated from "metal" figures. "Metal" may include metal content of compounds/salts and may include cobalt recovered from nickel-copper matte imported from Botswana for toll refining.

^{3/} Reported figure.

TABLE 2-Continued ZIMBABWE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

	Major operating companies		Annual
Commodity	and major equity owners	Location of main facilities	capacity
Ferroalloys:	_		
Ferrochromium,	Zimbabwe Mining and Smelting Co. (Pvt.) Ltd.	Smelter at Kwekwe	220
high-carbon	(Zimasco) (Zimasco Consolidated Enterprises, 100%)		
Ferrochromium,	Zimbabwe Alloys Ltd. (Zimalloys)	Smelter at Gweru	40
low-carbon	(Anglo American Corp., 100%)		
Ferrochromium-silicon	do.	do.	55
Lithium	Bikita Minerals (Pvt.) Ltd. (private, 100%)	Bikita Mine, 60 kilometers east of Masvingo	33
Nickel	Trojan Nickel Mines Ltd. (Bindura Nickel	Shangani, Madziwa, Trojan, and Epoch Mines	17
	Corp., 100%)		
Do.	Bindura Smelter & Refinery Ltd. (Bindura Nickel	Smelter and refinery at Bindura	16
	Corp., 100%)		
Do.	Rio Tinto Zimbabwe Ltd.	Empress Nickel Refinery, Eiffel Flats, northeast	11
		of Kadoma	
Platinum-group metals kilograms	Zimbabwe Mining and Smelting Co. (Pvt.) Ltd.	Mimosa Mines, east of Zvishavane	300
	(Zimasco) (Zimasco Consolidated Enterprises, 100%)		
Phosphate	Dorowa Minerals (Pvt.) Ltd. (Chemplex	Dorowa Mine, 90 kilometers west of Mutare	155
	Corp. Ltd., 100%)		
Vermiculite	Shawa Vermiculite (Pvt.) Ltd. (private, 100%)	Shawa Mine, near Dorowa	39
Do.	Dinidza Vermiculite Mining Co. (Pvt.) Ltd.	Dinidza Mine, near Dorowa	10
	(private, 100%)		

 $^{1/\,}Blast$ furnace No. 4 (capacity: $780,\!000$ metric tons per year) remained shut in 1996.