THE MINERAL INDUSTRY OF

ZIMBABWE

By George J. Coakley

The Republic of Zimbabwe is a landlocked nation in southern Africa surrounded by Zambia to the north, Mozambique to the east, South Africa to the south, and Botswana to the west. It covers an area of 390,580 square kilometers (km²) and supported a population of 12.6 million in 2002. For 2002, the International Monetary Fund (2003§1) reported that the nominal gross domestic product (GDP) was \$19.2 billion² based on the official exchange rate and \$7.1 billion based on world price; the real GDP declined by more than 30% between 1999 and 2002. Inflation rose to more than 220% by early 2003. The economy suffered severely during the past 4 years. Causal factors included the pegged exchange rate, limited capital availability, high inflation, and fuel and hard currency shortages. Although the official exchange rate was fixed at about 55 Zimbabwean dollars (Z\$) equal to the U.S. dollar in October 2000, the parallel market exchange rate reached more than Z\$1,700 to the U.S. dollar by yearend 2002. In February 2003, the Government adjusted the official rate to Z\$824=US\$1.00. High HIV/AIDS prevalence rates and food shortages created by droughts in 2001-02 led to a major humanitarian crisis in Zimbabwe and to the Government declaring a state of emergency in April 2002. The ongoing economic problems also delayed efforts to privatize many of the parastatal industries, such as electric power distribution, petroleum, railroads, and steel. In its review of the status of parastatals, the International Monetary Fund (2003§) reported that the state-owned National Railways of Zimbabwe (NRZ) had the capacity to carry 16 million metric tons per year (Mt/yr) but required more than \$200 million in maintenance. National Oil Company of Zimbabwe, which had an effective monopoly on importing petroleum products, lacked enough foreign exchange to import the oil necessary to meet domestic demand. Capacity utilization at Wankie Colliery Co., which was the country's only coal mine and supplier of coal for electricity and steel manufacturing and in which the Government held 40% interest, fell from 70% in early 2002 to 50% by yearend; Wankie will require \$100 million to rehabilitate operations. Zimbabwe Iron and Steel Corp., which was 100% owned by the Government, operated at only 15% of capacity during 2002 chiefly owing to a lack of working capital to pay for coal, transport, and other operating costs; the company had outstanding debts of about \$475 million and would need an additional \$175 million to upgrade its facilities.

In addition to economic and political difficulties, Zimbabwe had one of the highest incidences of HIV/AIDS infection in the world; by the end of 2001, 34% of the adult population between

15 and 49 years old was infected. This health care crisis directly impacted the productivity of agricultural workers, which contributed to food shortages in the country. An estimated 200,000 deaths were attributed to AIDS in 2001, and since the beginning of the epidemic, more than 780,000 children have been orphaned (Joint United Nations Programme on HIV/AIDS, 2002§). The HIV/AIDS epidemic had a significant impact on mining by adding substantially to direct and indirect labor costs as a result of absenteeism, lost productivity, medical expenses, and skill replacement.

Production and Trade

The mineral industry produced more than 35 mineral commodities chiefly from small-scale mines (table 1). Economic conditions forced many smaller mines to close between 2000 and 2002. The total value of mineral production, which was based on the official exchange rate, was about \$1.56 billion in 2002, or at more realistically valued parallel market rates, about \$580 million. Chromium and value-added ferroalloys accounted for 31.8% of the total value of mineral production; nickel and cobalt, 19.4%; gold, 19%; platinumgroup metals (PGMs), 11.9%; coal, 9.1%; and asbestos, 4%. Mineral production continued to decline to more than 40% from 3% in 2000 for most commodities. The few exceptions included production increases of 25% in phosphate rock, 24% in asbestos, and 6% each in ferrochromium and black granite. With the opening of two new mines, PGM production increased by more than 400% and was expected to be one of the few positive mineral industry trends for the next 5 years.

The gold sector continued to suffer from the weakened economy and governmental policies, which included the Reserve Bank's announcement in June 2001 that it would increase its hard currency holdback of export proceeds to 40% from 25%. A large number of mine closures caused gold production to drop to 15.5 metric tons (t) in 2002 from 27.7 t in 1999; this was a reduction of almost 45%. Despite this decline, gold remained the second largest export earner after tobacco. The Reserve Bank hard currency restrictions also impacted other mining operations that produced commodity minerals, such as asbestos and chromium, that were fully exported. Zimbabwe was a major contributor to the world supply of chrysotile asbestos, ferrochromium, and lithium minerals. Between 1998 and 2002, employment in the mining and quarrying sector declined to 41,000 workers from an estimated 61,000.

According to the International Monetary Fund (2003§), estimated trade data for 2002 indicated that of the total exports of \$1.42 billion for the year, mineral and manufactured metal exports accounted for \$415.6 million. Major exports included

¹References that include a section mark (§) are found in the Internet References Cited section.

²Where necessary, values have been converted from Zimbabwean dollars (Z\$) to U.S. dollars at the average exchange rate of Z\$54.95=US\$1.00 in 2002.

gold (\$168.7 million), ferroalloys (\$66.9 million), asbestos (\$63.8 million), nickel (\$39.2 million), and platinum (\$17.8 million). The main export trade partners were, in order of importance, South Africa, the United Kingdom, Germany, China, and Japan. Export earnings had been progressively declining since 1995 when \$736.6 million in minerals and manufactured metals was exported, although this can be attributed, in part, to declining commodity prices during this period. In 2002, imports of electricity and fuels, which included petroleum products, were valued at \$328.6 million, or 18% of total imports, which were valued at \$1.82 billion. South Africa supplied 39% of all imported goods.

Commodity Review

Metals

Chromium.—Production of chromite and ferrochromium was controlled by Zimbabwe Alloys Mines Limited (ZimAlloys) (a subsidiary of Anglo American plc) and Zimbabwe Mining and Smelting Co. (Pvt.) Ltd. (Zimasco). During 2002, production of chromite ore declined by 4% to 749,339 t, and production of high-carbon ferrochrome increased by 6% to 258,164 t. No low-carbon ferrochrome or ferrosilicon was produced during the year. ZimAlloys owned four mines along the Great Dyke— Inyala, Middle Dyke, North Dyke, and South Dyke. As of 2001, the remaining chromite resources were reported to be more than 283 million metric tons (Mt), with 75% of this resource located in the South Dyke Mine. Mining operations were suspended during 2002. ZimAlloys operated a ferrochromium smelter at Gweru, where historical capacity was 40,000 metric tons per year (t/yr) of low-carbon ferrochrome, 45,000 t/yr of highcarbon ferrochrome, and 30,000 t/vr of ferrosilicon. During 2002, the furnace mix was being converted to produce more high-carbon ferrochrome. Zimasco owned the Peak, Railway Block, Valley, South Dyke, Middle Dyke, and Mutorashanga chromite mines along the Great Dyke and the ferrochromium smelter at Kwekwe, which had the capacity to produce 180,000 t/vr of high-carbon ferrochrome (International Chromium Development Association, 2002§).

Gold.—Government policies continued to affect the gold sector negatively during 2002. By law, all gold had to be sold to the Reserve Bank of Zimbabwe with payment in local currency at a fixed rate, which was lower than the rate at which the companies could buy foreign exchange. This put the gold sector at a disadvantage to other companies whose commodities could be exported for hard currency. The Government paid gold companies 50% of earnings at a rate of Z\$800=US\$1.00. The other 50% was supposed to be paid in U.S. dollars, but foreign exchange shortages frequently prevented or delayed these payments (Africa Online, 2003§). Despite belated Government attempts during late 2001 to introduce a floor price for gold of Z\$23,650 per ounce of gold (equivalent to US\$430 per ounce at the official exchange rate), by early 2002, about 40 significant gold mines had gone out of business (Holloway, 2002). During 2002, the Government spent Z\$13 billion to support the gold industry subsidies.

Of the major gold producers in 2002, Ashanti Goldfields Co. Ltd. of Ghana, which was faced with shortages of liquefied petroleum gas for its processing facilities, saw production decline at the Freda-Rebecca Mine to 3,056 kilograms (kg) of gold compared with 3,193 kg in 2001 (Ashanti Goldfields Co. Ltd., 2003§). Rio Tinto Zimbabwe (Pty) Ltd. produced 1,182 kg of gold in 2002 compared with 2,084 kg in 2001. Of the 2002 total, 81.6% came from the Renco Mine, and the balance, from the Patchway Mine. Rio Tinto completed reprocessing of the Cam Mine tailings dump in 2001.

With the addition of new production from tailings reprocessing, Kinross Gold Corp. increased output at the Blanket Mine by 5% in 2002 to 1,336 kg of gold compared with 1,231 kg in 2001. Concerned with operating difficulties and foreign exchange restrictions, Kinross wrote down \$12 million in assets of the Blanket Mine at yearend 2001 but stated that the mine remained "self sustaining" during 2002 at total cash cost of \$243 per ounce of gold produced (Kinross Gold Corp., 2003§).

Gold output at Independence Gold Ltd., which was owned by Lonmin plc., increased slightly to 5,550 kg in 2002 from 5,260 kg in 2001. Independence Gold operated the Arcturus, How, and Shamva Mines; the Muriel Mine was closed in June 2001. The reserve and reserve base of gold increased to 130,600 kg (4.2 million ounces) during 2002. In October 2002, Lonmin sold Independence Gold to Pemberton International Investments Limited, which was a South African black economic empowerment corporation, for \$15.5 million (Lonmin plc, 2002§).

Cluff Mining plc operated the Maligreen gold deposit under a 50-50 joint-venture agreement with Pan African Mining. Although the Maligreen Mine was closed in mid-2002, Pan African Mining continued a feasibility study on developing the underlying sulfide ore body (Cluff Mining plc, 2003§).

Falcon Gold Zimbabwe Ltd. operated the Dalny and Venice gold mines at Kadoma and the Golden Quarry Mine at Shurugwi. The Venice Mine was closed in March 2002 after depletion of the high grade ore zone and was being offered for sale. For the year ending March 31, 2003, Falcon produced 990 kg of gold, which was an approximately 15% decline from the preceding year. Production declines were attributed to the Venice closure and treatment of lower grade material from the Dalny dumps and underground operation (Falcon Investment Holdings SA, 2003§).

Iron and Steel.—Production of crude steel at Zimbabwe Iron and Steel Company (ZISCO) operations decreased to 105,000 t, or nearly 60% less than that of 2000. The ZISCO steel plant had the capacity to produce 800,000 metric tons per year (t/yr) of crude steel.

Nickel.—Bindura Nickel Corp. Ltd. (BNC), which was owned by Anglo American plc (52.9%), operated the Madziwa, Shangani, and Trojan nickel mines; a nickel smelter; and a nickel refinery. The Madziwa Mine was placed on a careand-maintenance basis at yearend 2000; further exploration and evaluation continued in 2001. The Shangani Mine milled 928,500 t of ore at an average grade of 0.48% nickel; this

yielded 3,310 t of nickel contained in concentrates. A new subincline shaft at the Shangani Mine was scheduled to be commissioned during the first half of 2002; construction problems, however, set back commissioning to November 2003. During 2002, the Trojan Mine milled 1.03 Mt of ore at an average grade of 0.62% nickel; this yielded 4,444 t of nickel contained in concentrates, which was a 4% increase compared with that of 2001. Owing to a shortage in feedstock, production at the Bindura smelter and refinery declined by 13% to 11,165 t of nickel, of which 4,400 t was from toll material from Botswana. Because of the perceived political risk, Bindura lost its contract to toll refine nickel materials from the Nkomati nickel mine in South Africa at yearend, which represented about 1,740 t/yr of nickel metal. Bindura also produced 4,370 t of copper sulfide and 99 t of cobalt in cake. Combined measured, indicated, and inferred resources at BNC were estimated to be 34.5 Mt at a grade of 0.88% nickel, of which 2.2 Mt at a grade of 0.74% nickel was classified as proved and probable ore reserves (Bindura Nickel Corp. Ltd., 2003). Rio Tinto operated the Empress nickel refinery, which processed matte supplied from Botswana on a toll basis. The company toll refined 6,412 t of nickel in 2002 compared with 6,635 t of nickel in 2001.

Platinum-Group Metals.—With the contribution from the first full year of operation of Zimbabwe Platinum Mines Ltd.'s (Zimplats') new Makwiro project near Ngezi, PGM production increased by 500% to 4,729 kg in 2002. A breakout of PGM production by platinum-group element (PGE) is given in table 1. During the financial year ending June 30, 2003, Impala Platinum Holdings Limited (Implats) of South Africa increased its holdings in Zimplats to an 82% controlling interest from 49%. The company was committed to making 15% of its remaining equity shares available to Zimbabwean citizens. Zimplats reached full production at its Ngezi Mine and the Selous Metallurgical Complex (SMC) project. Ngezi is located about 77 kilometers (km) from the SMC project. Zimplats incorporated the Ngezi project under Makwiro Platinum Mines (Private) Ltd., in which it held a 70% interest. Makwiro will have the initial capacity to produce 3,350 kilograms per year (kg/yr) of platinum, 2,550 kg/yr of palladium, 370 kg/yr of gold, 250 kg/yr of rhodium, and nickel and copper as minor byproducts. During its first full year of operation, Makwiro mined 1.97 Mt of open pit ore at Ngezi and 32,500 t from trial underground mining at an average grade of 3.25 grams per metric ton (g/t), which yielded 5,264.6 kg of four elements (4E), namely gold, palladium, platinum, and rhodium. At projected PGM prices, Zimplats expected to recoup its capital investment in the Ngezi/SMC project by mid-2004. Makwiro was operating above design capacity by the end of the financial year but had a setback with a serious smelter incident in July 2003, which resulted in the smelter being off-line for 5 weeks. Underground development and feasibility studies were being conducted to expand the Ngezi open pit mine into ore reserves located to the north of the existing mine. A commitment to proceed with the Ngezi expansion was expected by the end of the 2003 calendar year. Zimplats reported total measured and indicated resources at its Ngezi South Tribute, Hartley, and Zimplats Tenements to

be 2.49 billion metric tons at grades of 2.0 g/t platinum, 1.6 g/t palladium, 0.3 g/t gold, and 0.14 g/t rhodium, of which total proved and probable ore reserves at Ngezi South Tribute and Ngezi Underground were 305 Mt at grades of 1.65 g/t platinum, 1.33 g/t palladium, 0.23 g/t gold, and 0.2 g/t rhodium. More than 88% of the ore reserves were in Ngezi Underground (Impala Platinum Holdings Ltd., 2003§; Zimbabwe Platinum Mines Ltd., 2003§).

ZCE Platinum (Pty) Ltd., which was a Mauritius-based company that was a 50-50 partnership between Aquarius Platinum Ltd. of Australia and Implats, operated the Mimosa Mine at the southern end of the Great Dyke. Implats increased its holdings to 50% from 32% of ZCE Platinum in mid-2002. ZCE Platinum planned to increase its production of platinum at the Mimosa Mine to 2,115 kg/yr of platinum by September 2003 from 466 kg/yr at a capital cost of \$38 million. Full PGM production will be 4,354 kg/yr. Concentrates will be sent to Impala Refining Services in South Africa for treatment. During the 2004 fiscal year, ZCE Platinum will conduct a new feasibility study on expanding the Mimosa operation. The Implats expansion into Zimbabwe was part of its overall goal to increase corporate platinum production to 62,200 kg (2 million ounces) by 2006. During the 2003 fiscal year, ZCE Platinum mined 755,000 t of ore that yielded 1,120 kg of platinum, 790 kg of palladium, and 87 kg of rhodium. Implats reported combined measured, indicated, and inferred resources as of June 30, 2003, at Mimosa to be 153.7 Mt at a grade of 3.88 g/t 3PGE plus gold, of which proved and probable reserves were 8.6 Mt at a grade of 3.79 g/t 3PGE plus gold (Impala Platinum Holdings Ltd., 2003§).

In April 2003, Anglo American Platinum Corp. Ltd. and Anglo American Corporation Zimbabwe Ltd. (Anzim) announced plans to proceed with the \$90 million development of the Unki platinum mine project near Gweru on the Great Dyke. The project will involve construction of an 85,000-metric-ton-per-month mine and concentrator. Full production of 2,644 kg/yr of platinum was expected by 2007. The project was based on measured and indicated resources of 48.6 Mt at a grade of 4.98 4PGE, of which 37.1 Mt at a grade of 4.30 4PGE were proved and probable reserves (Anglo American Platinum Corp. Ltd, 2004§; McKay, 2003§).

Industrial Minerals

Asbestos.—African Associated Mines (Pty.) Ltd. produced chrysotile asbestos from its Gaths and Shabanie Mines and employed about 6,000 people. Production in 2002 was up by 24% to 167,954 t as a result of the company's expanding production in response to supply pressures that resulted from asbestos mine closures in Canada and South Africa.

Lithium.—Bikita Minerals (Pvt.) Ltd., which was owned by AMZIM Minerals Ltd., was one of the world's largest producers of lithium-bearing petalite. Production declined by 13% to 33,172 t compared with that of 2000. The company exported four grades of petalite, which included grades for lithium tiles and container glass, and a separate spodumene concentrate.

Mineral Fuels

Like other companies, Wankie, which operated the country's only coal mine near Hwange, was unable to meet demand for its product owing to foreign currency shortages, price controls, transport constraints, and loss of critical skills. In 2002, production decreased by 8% to 3.45 Mt. During 2002, Wankie saw an 8% decrease in coal sales to 1.24 Mt. Sales of power station coal also decreased to more than 2.20 Mt from almost 2.34 Mt. Coke sales dropped to 224,111 t from 245,822 t in 2001 owing, in part, to transport constraints in getting material to use in ZISCO's excess coke oven capacity. Coke oven gas dropped to 24.3 million cubic meters from 27.1 million cubic meters. Coal prices fixed by the Government at Z\$1,300 per metric ton for Hwange Power Station coal were below Wankie's production costs; this contributed to the marginally higher operating loss for the year of Z\$7.89 billion. The company approved plans to develop a new low-phosphorous underground coal mine to be referred to as "3 Main," a new coke oven battery, and a new truck-loading facility to keep up with increasing demand for its products and to compensate for undependable rail service (Wankie Colliery Co., 2003§).

Zimbabwe has no domestic reserves of oil or gas and depended on coal, hydropower, and imports to meet its energy requirements. Like many African countries, firewood and charcoal were major sources of fuel, particularly for household cooking. Coal reserves as of 2000 were reported to be approximately 500 Mt (U.S. Energy Information Administration, 2002§). The country no longer had a functioning oil refinery and spent more than \$380 million in 2002 to import energy and petroleum products from South Africa. Fuel shortages that resulted from the economic crisis in the country remained a major problem during the year.

Infrastructure

Most of landlocked Zimbabwe's bulk commodities were moved by rail on the state-owned NRZ. All major cities and industrial centers were linked to Botswana, Mozambique, South Africa, and Zambia by the NRZ. Petroleum products were piped through Mozambique via the Beira pipeline to Feruka and then moved west via the Mutare-Harare pipeline or trucked on Zimbabwe's 85,784-km road network. Additional petroleum products were imported via railroad tanker cars through South Africa.

Outlook

The short-term outlook for the mining sector is not favorable with the exception of several new platinum developments. The platinum projects being undertaken by South African companies have been able to proceed with logistical support from South Africa to overcome fuel and other shortages. Excess Government intervention in the economy and in state-run industries has been a major contributor to the growing number of closed mines and suspended projects that are undermining the ability of the mining sectors to continue to generate more than 25% of Zimbabwe's foreign export earnings. Price and currency

controls make it difficult for companies to benefit from a rising trend in global commodity prices, which will have a continuing negative impact on ferroalloys, gold, and steel operations. The natural-resource endowment and a well-developed infrastructure remain in place. Until the Government can complete the privatization of its interests in the energy, mining, and rail sectors; repay the debts of the parastatal industries; and loosen its foreign exchange rules. Attracting the open competition and entrepreneurship needed to stimulate the economy, however, will be difficult.

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Major Sources of Information

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Bartholomew, D.S., 1990, Base metal and industrial mineral deposits of Zimbabwe: Harare, Zimbabwe, Zimbabwe Geological Survey Mineral Resources Series No. 22, 154 p.

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 $\label{eq:table1} \textbf{TABLE 1}$ ZIMBABWE: PRODUCTION OF MINERAL COMMODITIES 1,2

(Metric tons unless otherwise specified)

Commodity		1998	1999	2000	2001	2002
METALS						
Chromite, gross weight		669,757 ^r	605,405 ^r	668,043 ^r	780,150 ^r	749,339
Cobalt, metal ³		138	121	79 4	95	99
Copper:						
Mine output, concentrate, Cu content		2,941	4,511	2,104	2,057	2,502
Metal:						
Smelter output, blister/anode, primary ^e		14,500	14,500	14,500	2,160	2,000
Refinery output, refined/cathode, primary		11,000	10,000	10,200	2,057	2,000 e
Gold	kilograms	25,175	27,666	22,069	18,050	15,469
Iron and steel:						
Mine output, iron ore:						
Gross weight	thousand tons	372	599	451	361	272
Fe content ^e	do.	190	300	225	180	136
Metal:						
Pig iron	do.	230	270 r	277 ^r	156	122
Steel, crude	do.	220	255	258	149 ^r	105
Ferroalloys:						
Ferrochromium		233,386 ^r	246,782 ^r	244,379 r, 4	243,534 ^r	258,164
Ferrosilicon chromium	do.	21	16	20	17	
Nickel:						
Mine output, concentrate, Ni content		12,872	11,164	8,160 e	10,120	8,092
Refinery output, refined metal:						
Refined from domestic materials		8,732	9,106	6,678	7,440	6,765
Toll refined from imported materials ⁵		8,709	10,676	12,931	12,084	10,812
Total refined nickel metal		17,441	19,782	19,609	19,524	17,577
Platinum-group metals:						
Palladium	kilograms	1,855	342	366	371	1,943
Platinum	do.	2,730	479	505	519	2,306
Rhodium	do.	177	37	40	42	218
Ruthenium	do.	NA	NA	NA	NA	178
Iridium	do.	NA	NA	NA	NA	84
Osmium		NA	NA	NA	NA	NA
Total		4,762	858	911	932	4,729 e
Silver	do.	6,681	5,181	3,799	3,449	1,711
Tantalum, mine output, Ta content ²		6	1	1	21 ^r	338
INDUSTRIAL MINERALS		-	_			
Asbestos	thousand tons	123	115	152	136	168
Barite		1,844	1,000 e	5,032	7,464	
Cement, hydraulic ^e	do.	1,100	1,000	1,000	800 r	600
Clays:	<u>uo.</u>	1,100	1,000	1,000	000	000
Bentonite, (montmorillonite)		135,785	140,000 e			
Other clays ⁶		12,000	12,000	589	2,247	3,789
Diamond	carats	28,732	45,324	23,028 ^r	2,247	3,767
Feldspar	Carats	2,241	2,250	2,059	1,055	591
Fluorspar		2,241	2,230	2,039	1,033	250
Gemstones:						230
Amethyst	kilograms	NA	NA	10,376	840	NA
Emerald			20,000	33	57	NA NA
	do.	19,302	· ·			
Graphite Vyanita		13,806	11,405	11,838 4	11,836	9,912 5,657
Kyanite Lithium minorals, gross weight		3,780	4,000 ^e	10,970	9,682	5,657
Lithium minerals, gross weight		28,055	36,671	37,914 ⁴	36,103	33,172
Magnesite		4,321	5,356	4,029	2,439	2,366
Mica		1,309	1,300 e	 50 400 4		
Nitrogen, N content of ammonia		56,500 e	60,800 4	58,400 ⁴	57,500	60,900
Perlite			5,356	5,000	5,000	5,000
Phosphate rock, marketable concentrate		91,000	126,000	77,662	86,611	107,854

$\label{thm:continued} TABLE~1\mbox{--}Continued$ ZIMBABWE: PRODUCTION OF MINERAL COMMODITIES 1,2

(Metric tons unless otherwise specified)

Commodity		1998	1999	2000	2001	2002
Stone, sand and gravel:						
Granite, black		125,576	130,000 e	130,000	385,532	408,550
Limestone thousa	and tons	1,473	1,500 e	1,500	3,799	3,169
Quartz, rough ⁷	do.	40 e	40 e	121 ^e	28	6,790
Sulfur:						
Pyrite:						
Gross weight		52,908	48,793	69,119	98,037	87,592
S content (32.6%)		15,250	15,900	22,530	31,960	28,555
Byproduct acid, metallurgical and coal process gas ^e		2,500	2,500	2,500	2,000	2,000
Total		17,750	18,400	25,030	33,960	30,555
Talc		1,039	1,000 e	989	1,273	911
Vermiculite		14,804	13,898	16,215	11,632	23,803
MINERAL FUELS AND RELATED MATERIAL	S					
Coal, bituminous thousa	and tons	5,047	4,576	3,809 4	4,064	3,721
Coke, metallurgical ^e	do.	600	600	600	245	224

^eEstimated. ^rRevised. NA Not available. -- Zero.

¹Table includes data available through November, 2003.

²Estimated data are rounded to no more than three significant digits; may not add to totals shown.

³"Metal" includes metal content of compounds/salts and may include cobalt recovered from nickel-copper matte imported for toll refining.

⁴Reported figure.

⁵Toll refined data includes all of Empress Refinery production from Botswana imports and part of Bindura output.

⁶Includes fire clay.

⁷Includes rough and ground quartz, as well as silica sand.