



2011 Minerals Yearbook

ZAMBIA

THE MINERAL INDUSTRY OF ZAMBIA

By Philip M. Mobbs

Copper mining and refining were the dominant components of Zambia's mineral industry. In 2011, Zambia was estimated to rank sixth in the world in the production of copper ore and fifth in the production of cobalt ore. Zambia also was an internationally significant producer of semiprecious gemstones (Nyambe and Phiri, 2010, slide 14; Edelstein, 2012; Shedd, 2012).

Minerals in the National Economy

In 2011, the construction sector accounted for 12% of Zambia's real gross domestic product (GDP) (at constant 1994 prices) compared with 11.7% in 2010. The value of activity in the mining and quarrying sector decreased to 8.8% of Zambia's real GDP in 2011 compared with a revised 9.8% in 2010. The Bank of Zambia attributed the mining and quarrying sector's lower contribution to the GDP in part to the production of lower grade copper ore and a decrease in world cobalt prices in 2011 (Bank of Zambia, 2012, p. 31, 33, 35; Shedd, 2012).

The value of copper exports was estimated to be about \$6.9 billion in 2011, when copper exports accounted for an estimated 78% of Zambia's merchandise exports. The value of exports of cobalt was estimated to be \$267 million (3% of the preliminary value of Zambia's exports in 2011). The value of imports of petroleum was estimated to be about \$531 million in 2011, when oil accounted for 8% of Zambia's imports, compared with 13% in 2010. The preliminary value of imports of fertilizer increased to \$330 million compared with \$215 million in 2010 (Bank of Zambia, 2012, p. 21).

The Zambia Development Agency reported that investment agreements in Zambia totaled \$5.4 billion in 2011. The energy sector was expected to receive \$1 billion of the pledged investment dollars, and the mining sector attracted \$983 million (Zambia Development Agency, 2012).

Government Policies and Programs

The mining sector is regulated primarily by Act No. 7 of 2008 (the Mines and Mineral Development Act of 2008). Uranium exploration and mining are regulated by the Mines and Minerals Development (Prospecting, Mining and Milling of Uranium Ores and Other Radioactive Mineral Ores) Regulations of 2008.

The Income Tax Act (Chapter 323 of the Laws of Zambia) and recent changes, such as the Income Tax (Amendment) Act of 2008 and Income Tax (Amendment) Act No. 27 of 2009, and the Mines and Minerals Development Act of 2008, address capital allowances, mineral royalties, mining development agreements, the variable profits tax, and the windfall tax. Investment in most types of mineral operations are covered by the Zambia Development Agency Act of 2006, although minerals produced for the construction industry, such as clay, sand, and most types of stone, are excluded. The Engineering Institution of Zambia Act of 2010 requires that the Engineering Institution of Zambia register and regulate the conduct of professional engineers.

The Environmental Protection and Pollution Control Act of 1990 and its 1999 amendment address environmental issues, including those associated with the mining industry. Petroleum exploration and production are regulated by Act No. 10 of 2008 [the Petroleum (Exploration and Production) Act of 2008].

In October, the new Government stopped issuing artisan's mining rights; gemstone, mining, and prospecting licenses, including license renewals and the transfer of mining rights; and mineral processing licenses, so that it could audit the outstanding permits. The Government also planned to install a computerized licensing system to increase the accountability and transparency of the license system. The ban on new licenses remained in effect at yearend (Thomson Reuters, 2012).

Production

Data on estimated Zambian mineral production are in table 1. Notable increases in production were estimated for cobalt ore, crude steel, and crushed limestone. Production of some types of gemstones, refined petroleum products, and sulfur were estimated to have decreased significantly in 2011.

Structure of the Mineral Industry

Many of the country's large copper mining and processing operations are located in Copperbelt Province in north-central Zambia. The Government retains minority interest in most of the large copper projects through its holding company Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH). The mining sector is administered by the Geological Survey Department, the Mines Development Department, and the Mines Safety Department of the Ministry of Mines and Minerals Development. The Ministry of Commerce, Trade and Industry oversees the industrial manufacturing sector. Data on the capacity and ownership of selected mineral operations are in table 2.

Commodity Review

Metals

Cobalt, Copper, and Gold.—In July, Barrick Gold Corp. of Canada acquired Equinox Minerals Ltd. of Canada. Equinox owned Lumwana Mining Company Ltd., which operated the Lumwana copper mine. Barrick continued an extensive resource definition drill program that was underway at Lumwana.

An initial bid by Vale S.A. of Brazil to acquire Metorex Ltd. of South Africa and its interest in the underground Chibuluma copper mine was superseded by an offer from Newshelf 1124 (Proprietary) Ltd. of South Africa, which was an indirect subsidiary of the Jinchuan Group Ltd. of China. Newshelf was expected to complete the acquisition in early 2012. At mid-year, as part of the preparations for its sale, Metorex announced the divestment of its interest in the Sable Zinc Kabwe Ltd. copper

and cobalt plant to a subsidiary of Glencore International plc of Switzerland (Metorex Ltd., 2011, p. 7).

In 2011, First Quantum Minerals Ltd. of Canada mined 24.5 million metric tons (Mt) of ore from the Main and the Northwest pits at the Kansanshi Mine. The Kansanshi solvent extraction and electrowinning plant produced 187,923 metric tons (t) of copper cathode in 2011, of which 51% was recovered from ore produced by First Quantum. The Kansanshi output also included 42,372 t of copper contained in concentrate and about 3,500 kilograms (kg) of gold. First Quantum continued work on the project to expand Kansanshi's total copper production capacity to 400,000 metric tons per year (t/yr) by 2015. The increase in total copper output would include both copper cathode and copper in concentrate (First Quantum Minerals Ltd., 2012a, p. 9, 36).

First Quantum's exploration activity at Kansanshi included drill programs on several prospects surrounding the Main and Northwest pits and the Southeast Dome; the Kansanshi-area diamond drill programs were expected to recover about 140,000 meters (m) of core. In 2011, the company received mining licenses for the development of the Trident project, which included the Sentinel copper prospect. First Quantum's subsidiary, Kalumbila Minerals Ltd., completed a 514-hole 172,000-m diamond drill program at Sentinel and released a NI 43-101-compliant resource estimate of about 1.03 billion metric tons of ore at a grade of 0.51% copper. The company also approved the construction of the 300,000-t/yr-capacity Sentinel copper smelter, which was expected to be completed in 2014 (First Quantum Minerals Ltd., 2012a, p. 13; 2012b, p. 40–41).

In 2011, Konkola Copper Mines plc (KCM) produced 201,000 t of copper cathode in 2011 compared with 222,000 t in 2010. Of KCM's total cathode output, 69% was derived from copper ore produced by the company. KCM continued work on the Konkola Deep Mine project, the Nchanga East concentrator, and the Nchanga West concentrator (Vedanta Resources plc, 2011; 2012, p. 5).

Konnoco Zambia Ltd., which was a joint venture of African Rainbow Minerals Ltd. of South Africa and Vale, continued the development of the Konkola North underground copper mine with work on the access declines and the vertical shaft. The mine's concentrator was expected to be commissioned in December 2012, and production was expected to reach 45,000 t/yr of contained copper by mid-2015 (African Rainbow Minerals Ltd., 2012, p. 70).

In 2011, Mopani Copper Mines Plc produced 101,400 t of copper and about 600 t of cobalt contained in concentrate and hydroxide from the Mufulira and the Nkana copper mines compared with 94,400 t of copper and 800 t of cobalt in 2010. Mopani also produced 103,000 t of copper and about 300 t of cobalt from ore obtained from other companies and traders in both 2010 and 2011. The decrease in cobalt production was attributed to lower cobalt grades in processed ore and the Nkana cobalt roaster being placed on care-and-maintenance status. In 2011, work continued on the refurbishment of the Mufulira smelter, which would reduce the smelter's emissions (Glencore International plc, 2012, p. 53, 56).

The joint venture of Seringa Mining Ltd., which was a subsidiary of Zambia Mining Ltd. of the British Virgin Islands,

and Katanga Resources Ltd., which was a subsidiary of African Eagle Resources plc of the United Kingdom, began the construction of a small heap-leach facility at the Mkushi copper project. The heap leach was expected to be operational in late 2012. African Eagle, however, continued the long-planned disposal of its Zambian copper interests (including the Mkushi project) to focus on a nickel project in Tanzania (African Eagle Resources, plc, 2012, p. 6).

Numerous domestic and international exploration companies were active in Zambia. Argonaut Resources NL of Australia's subsidiary Lumwana West Resources Ltd. formed a joint venture with Mwombeshi Resources Ltd. of Zambia to explore in Northwestern Province. Lumwana West completed a 23-hole drilling program (1,929-m reverse circulation and 2,185-m diamond drilling) on the Nyungu prospect (Argonaut Resources NL, 2012, p. 2).

In 2011, BHP Billiton Ltd. of Australia withdrew from the Mumbwa project, terminated its joint venture with Blackthorn Resources Ltd. of Australia, and returned operational control of the Mumbwa project to Blackthorn. In August, Blackthorn initiated an 8,800-m diamond drill program on the Kitumba and the Mutoya prospects (Blackthorn Resources Ltd., 2011; 2012, p. 5–8).

Caledonia Mining Corp. of Canada completed a 5-hole diamond drill program on the Nama cobalt and copper prospect. Caledonia planned to start an 8,000-m exploration drilling program in 2012 (Caledonia Mining Corp., 2012).

Chrysalis Resources Ltd. initiated the acquisition of 100% equity interest in Zambia Copper Proprietary Ltd., which was a copper exploration company, and 99.9% equity interest in Sedgwick Resource Ltd., which was a subsidiary of Zambia Copper. Ministerial approval of the transfer was not obtained, and the issue remained pending at yearend (Chrysalis Resources Ltd., 2011a, b).

In 2011, Luiru Gold Ltd. of Canada resolved the issue concerning its reported default of its mining license (LML48) and subsequently reorganized as an Australian-domiciled company. Luiru evaluated the results of an assay of cutting samples from a 34-hole reverse-circulation drilling program on the Luiru Hill project that was completed in 2010 and continued exploration with a trenching program in 2011 (Luiru Gold Ltd., 2012, p. 3).

Mwembeshi Resources Ltd., which was a subsidiary of Zambezi Resources Ltd. of Bermuda, completed a 94-hole 22,183-m diamond drill program on the Kangaluwi project, which included the Chisawa, the Kalulu, and the Kamgaluwi copper prospects and the Chakwenga, the Chiwuyu, and the Moiya copper and gold prospects. Zambezi expected to update the project's resource estimate in 2012, based on the results of the drilling on the Kalulu prospect (Zambezi Resources Ltd., 2012, p. 6–11).

Other activity in 2011 included Harmony Gold Corp. of Canada's agreeing to an option to acquire the Kafwego-Mufumbwe copper project from Montauk Mining and Minerals Ltd. The exploration alliance of Korea Resources Corp. of the Republic of Korea and SD Mining Ltd. of Zambia was exploring for copper and gold. Swanex Zambia Proprietary Ltd., which was a subsidiary of Africo Resources Ltd. of Canada, allowed its Mporokoso gold prospecting license to expire.

Iron and Steel and Iron Ore.—In 2011, the Government banned the export of scrap steel, which was expected to result in an increase in the availability of additional scrap metal to feed the needs of the domestic steel industry. Universal Mining and Chemicals Industries Ltd. reportedly began construction of a 60-kilometer road from its Kafue steel plant to the planned Sanje Hill iron mine site (Chulu and Wangwe, 2011; Sinkamba, 2011).

Lead and Zinc.—Berkeley Mineral Resources Plc of the United Kingdom was evaluating the resources of the former Kabwe lead-zinc mine, including the partially-mined or unmined sections of the underground deposit, the slag stockpile, and the tailings.

Gravita Zambia Ltd. had operated Pakrik Zambia Ltd.'s secondary lead smelter in Lusaka, which was built by Gravita Exim Ltd. of India to process lead-acid battery scrap. Gravita Exim divested its interest in Gravita Zambia by March (Gravita India Ltd., 2011, p. 26).

Manganese.—Manganese ore was produced primarily by small-scale operations near Mansa in Luapula Province and Mkushi in Central Province. Domestic subsidiaries of international companies that were involved in the small-scale manganese ore operations included Ore and Steel Feed Industries, which was a subsidiary of Contrarian Investment Holdings (Proprietary) Ltd. of South Africa; Peniel Mines, which was a subsidiary of MGR Commodities and Gems of South Africa; Taurian Manganese Ltd., which was a subsidiary of Dharni Sampda Private Ltd. of India; and the joint venture of Genesis Procurement Ltd. and Luapula Base Metals Ltd. Taurian started mining ore near Mansa in 2011. Taurian also proposed to build a 240,000-t/yr-capacity ferromanganese plant near Mansa in 2012 and to expand the plant's capacity to 720,000 t/yr by 2014. Manganese traders included San He Zambia Ltd., which exported high-carbon ferromanganese (Thomson Reuters, 2011).

Allegra Mining Zambia Ltd., which was a subsidiary of Ethan Minerals Ltd. of Australia, dissolved its Mkushi area exploration joint venture (Kafwa project) with Eagle Eye Mining Ltd. of Zambia in 2010. Allegra entered into numerous other joint ventures with companies and individuals that held manganese mining and prospecting licenses. Properties included the Kampumba Mine, from which illegal mining operations recently had produced an estimated 650,000 t/yr of manganese ore at an average grade range of 50% to 61% manganese. Allegra proposed to mechanize the operations at the Kampumba Mine. In mid-2011, however, financial difficulties forced Ethan Minerals to appoint external Administrators to take control of the company. The Administrators established a Creditors' Trust and transferred Ethan's 100% equity interest in Allegra Mining to the Creditors' Trust for disposal (Ethan Minerals Ltd., 2010, 2011; Prospect Resources Ltd., 2012, p. 22).

Atticus Resources Ltd. of Australia initiated the acquisition of Zamanco Holdings Ltd. of Mauritius. Zamanco held two Zambian companies—Zamanco Minerals Ltd. (100% equity interest) and Zamanone Mining Ltd. (75% interest). Zamanco had proposed to develop the Serenje manganese project, which included an 180,000-t/yr-capacity manganese concentrate facility, three smelters with a total production capacity of 60,000 t/yr of high-carbon ferromanganese (with an expected average 78% manganese content), and a 12,000-t/yr-capacity

aluminothermic smelter, which would produce manganese metal with a 95% manganese content (Atticus Resources Ltd., 2011, p. 6–13; Zamanco Minerals Ltd., 2012, slide 9).

In 2011, Uran Ltd. of Australia acquired African Asian Mining Development Ltd. of South Africa, which held 51% interest in several manganese mining and prospecting licenses. Uran mined about 2,000 t of material from the Chowa pit, which was part of the Emmanuel property, and recovered 512 t of lump manganese ore, which was shipped to China for evaluation. Uran subsequently changed its name to Kaboko Mining Ltd. (Kaboko Mining Ltd., 2012, p. 1–3).

Nickel.—Albidon Zambia Ltd., which was a subsidiary of Albidon Ltd. of Australia, temporarily suspended mining operations at the Munal Mine on November 11; milling operations ceased on November 22; and the mine and mill were placed on care-and-maintenance status. In 2011, Albidon mined 1.4 Mt of ore compared with 701,303 t of ore in 2010. Albidon milled 651,650 t of ore in 2011 from which 34,537 t of nickel concentrate was recovered. The concentrate, which contained 2,869 t of nickel, was sold to the Jinchuan Group Ltd. of China (Albidon Ltd., 2011a, p. 4; b, p. 4; c, p. 4; 2012a, p. 4; b, p. 3).

First Quantum received mining licenses for the development of the Trident project, which also included the Enterprise nickel sulfide prospect in addition to the Sentinel copper prospect. In 2011, First Quantum cored 68,000 m in 195 holes in 2011 as part of an ongoing diamond drill program (First Quantum Minerals Ltd., 2012a, p. 15).

Industrial Minerals

Gemstones.—Kagem Mining Ltd., which was a joint venture of Hagura Mining Ltd. (75%) and the Government of Zambia (25%), continued to expand its surface amethyst and emerald mining operations and proceeded with an underground emerald trial mining program. Gemfields PLC of the United Kingdom, which owned Hagura, reported the completion of a 9-hole 2,073-m drill program, which was part of a reevaluation of the property's mineral resources (Gemfields PLC, 2012, p. 4–5).

In 2011, the Government initiated the transfer of its 50% interest in Kariba Minerals Ltd. to ZCCM-IH. Also in 2011, Mayfair Mining & Minerals, Inc. of the United States, whose indirect subsidiary [Mayfair Mining & Minerals (Zambia) Ltd.] had suspended its efforts to reopen an amethyst mine in Zambia in 2008, announced that it was considering the disposal of its assets in Zambia to focus on developing a mine in Zimbabwe. In November, however, the U.S. Securities and Exchange Commission revoked the registration of the securities of Mayfair Mining & Minerals, Inc. (Mayfair Mining & Minerals, Inc., 2011, 1–2, F-11–F-12; U.S. Securities and Exchange Commission, 2011).

Rare Earths.—Southern Crown Resources Ltd. of Australia acquired Rare Earth International (REI) of Australia in 2010. REI held a 4-phase option to acquire up to 75% interest in a joint-venture project with African Consolidated Resources plc (ACR) of the United Kingdom. The joint venture planned to explore the Nkombwa Hill carbonatite for rare earths; ACR retained the development rights for other minerals, such as niobium and phosphate rock, which had been evaluated

previously. Southern Crown's initial exploration included an outcrop sampling program and a 437-line-kilometer airborne magnetic and radiometric survey. In October, Southern Cross postponed a planned diamond-drilling program after ACR discovered that a portion of the area covered by the joint venture's exploration license also had been awarded to another entity. Southern Crown completed a rock-chip sampling program across the prospect while awaiting the resolution of the lease issue (African Consolidated Resources plc, 2010; 2011; Southern Crown Resources Ltd., 2012, p. 1–3).

Mineral Fuels and Related Materials

Coal.—Maamba Collieries Ltd. resumed coal production in late 2011 at the rate of about 30,000 metric tons per month. A consortium of Nava Bharat Proprietary Ltd. of Singapore (which was a subsidiary of Nava Bharat Ventures Ltd. of India) and local Zambian investors rehabilitated the mine after acquiring of 65% equity interest in Maamba Collieries in early 2010. Mining at Maamba had been suspended in 2007 owing to financial problems. Financial difficulties also ended a short-lived attempt to restart production in mid-2009 (Energy Regulation Board, 2009, p. 34; Lusaka Times, 2009; Mulikelella, 2012).

African Energy Resources Ltd. of Australia reported the occurrence of coal in water wells in the Kariba Valley. In January 2012, African Energy completed a 9-hole 1,691-m diamond drill program to evaluate the coal occurrence (African Energy Resources Ltd., 2012, p. 6).

Uranium.—Denison Mines Zambia Ltd., which was a subsidiary of Denison Mines Corp. of Canada, completed a 9,600-m drill program on the Dibwe East prospect of the Mutanga project. An update of the Mutanga project's mineral resource estimate was expected to be released in 2012 (Denison Mines Corp., 2012, p. 12).

Outlook

Announced expansions of copper mine output capacities could result in annual copper production exceeding 1 Mt/yr when all the projects reach their full proposed production levels. Historically, the country's mining industry has been dominated by the copper sector, although Zambia has many deposits and occurrences of other metals and industrial minerals, such as barite, feldspar, graphite, iron ore, kaolin, lead, silica sand, talc, and zinc. Landlocked Zambia faces several internal and external obstacles to successful diversification of its mineral production, however; these include the availability of electrical energy and fuel supplies, cyclical world commodity prices, high transportation costs, limited national infrastructure, and the threat that high HIV/AIDS rates in the region pose to maintaining a skilled labor force.

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TABLE 1
ZAMBIA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	2007	2008	2009	2010	2011
METALS					
Cobalt:					
Mine output, Co content	7,500	7,000	4,900	5,700	6,600
Metal, Co content	4,335 ⁴	4,049 ⁴	1,271 ⁴	1,092 ⁴	1,100
Copper:⁵					
Mine output, Cu content:					
By concentration or cementation	341,000	372,000 ^r	557,000 ^r	540,000 ^r	524,000
Leaching, electrowon	168,000	162,000 ^r	141,000 ^r	146,000 ^r	144,000
Total	509,000	534,000 ^r	698,000 ^r	686,000 ^r	668,000
Metal, smelter, primary, includes low-grade electrowon					
224,000	232,000	334,000 ^r	490,000	511,000	
Refinery, primary:					
Electrowon	200,000	175,000	145,000	160,000	146,000
Other	230,000	240,000 ^r	269,000 ^r	370,000	370,000
Total	430,000	415,000 ^r	414,000 ^r	530,000	516,000
Gold kilograms	1,270	1,930	3,100	3,400	3,500
Iron and steel, crude steel	--	--	10,000	40,000	50,000
Lead, metal, secondary	1,000	1,000	1,000	1,000	1,000
Manganese:					
Gross weight	2,000	55,000	40,000	120,000	120,000
Mn content	644	17,000	13,000	40,000	40,000
Nickel, Ni content of concentrates	--	750	280	2,809 ⁴	2,869 ⁴
Silver kilograms	3,500	4,000	6,000	6,500	6,500
INDUSTRIAL MINERALS					
Cement	540,000	560,000	880,000	1,126,728 ⁴	1,200,000
Clays:					
Brick	3,300	3,000	3,000	3,100	3,100
Building, not further specified	33,000	30,000	30,000	31,000	31,000
China and ball	200	200	200	200	200
Gemstones:					
Amethyst kilograms	1,300,000	900,000	1,400,000	1,300,000	1,000,000
Beryl do.	5,000	4,000	6,000	5,500	6,000
Emerald do.	2,100	1,600	37,850 ⁴	21,086 ⁴	23,000
Tourmaline do.	25,000	15,000	21,000	20,000	15,000
Lime, calcined thousand metric tons	165	135	130	140	150
Limestone:					
For cement and lime do.	1,200	1,300	2,000	2,500 ^r	2,600
Crushed aggregate do.	700	700	750	800	1,000
Sand and gravel, construction do.	300	300	320	350	360
Sulfur:					
Gross weight:					
Pyrite concentrate	290,000	290,000	100,000	--	--
Sulfuric acid ⁶	15,000	40,000	600,000	990,000	800,000
Sulfur content:					
Pyrite concentrate (42% S)	123,000	123,000	42,000	--	--
Sulfuric acid (32.6% S)	4,900	13,000 ^r	200,000	300,000	240,000
Total, S content	128,000	140,000	240,000	300,000	240,000
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous	220,000	220,000	200,000	200,000	220,000
Petroleum, refinery products thousand 42-gallon barrels	3,200 ^r	3,500 ^r	4,300 ^r	4,500	3,500

^rRevised. do. Ditto. -- Zero.

¹Estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through July 27, 2012.

³In addition to the commodities listed, palladium, platinum, and selenium may be produced, but information is inadequate to estimate output.

⁴Reported figure.

⁵Terms used are as defined by the International Copper Study Group.

⁶From the Chambishi and the Nkana acid recovery plants.

TABLE 2
ZAMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement	Lafarge Cement Zambia plc (Pan African Cement Ltd., ¹ 50%, and Financiere Lafarge S.A., ¹ 34%)	Chilanga II plant, about 15 kilometers south of Lusaka	830,000.
Do.	do.	Ndola plant	450,000.
Do.	do.	Chilanga I plant, about 15 kilometers south of Lusaka	200,000.
Do.	Scirocco Enterprises Ltd.	About 18 kilometers southwest of Lusaka	100,000.
Do.	Zambezi Portland Cement Ltd.	Ndola	330,000.
Coal, bituminous	Maamba Collieries Ltd. (Nava Bharat consortium, 65%, and Zambia Consolidated Copper Mines Investments Holdings Plc, 35%)	350 kilometers south of Lusaka in the Kanzie and the Izuma Basins	360,000.
Do.	Collum Coal Mining Industries Ltd.	Kandabwe Mine, near Sinazongwe	240,000.
Copper and cobalt:			
Ore and concentrate	Lumwana Mining Company Ltd. (Barrick Gold Corp., 100%)	Lumwana Mine (Malundwe pit)	20,000,000 ore.
Do.	Kansanshi Mining plc [Kansanshi Holdings Ltd., ² 79.4%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 20.6%]	Kansanshi Mine, north of Solwezi	12,000,000 sulfide ore, 8,400,000 mixed ore, 6,100,000 oxide ore.
Do.	Konkola Copper Mines plc [Vedanta Resources plc., 79.4%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 20.6%]	Chingola open pit A and Nchanga open pit, Chingola	4,500,000 ore.
Do.	do.	Nchanga underground mine, Chingola	2,800,000 ore.
Do.	do.	Konkola Mine, Chililabombwe	2,400,000 ore.
Do.	do.	Fitwaola open pit, Chingola	NA. ³
Do.	do.	Reprocessing material from the TD3a, the TD3b, the TD5, and the TD7 tailings dams, Chingola	NA.
Do.	Mopani Copper Mines plc [Carlisa Investments Corp., ⁴ 90%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 10%]	Nkana Mine, includes the Central, the Mindola North, the Mindola Sub-Vertical, and the South Ore Body shafts for underground operations, and the Area A, the Area E, and the Mindola open pits	5,500,000 ore.
Do.	do.	Mufulira Mine	2,500,000 ore.
Do.	CNMC Luanshya Copper Mines Ltd. (NFC Africa Mining plc, 100%)	Baluba underground mine	1,800,000 ore.
Do.	NFC Africa Mining plc [China Nonferrous Metal Mining (Group) Company Ltd., 85%, and Zambia Consolidated Copper Mines Investments Holdings Plc, (ZCCM-IH) 15%]	Chambishi Mine	800,000 ore, which yields about 50,000 copper in concentrate.
Do.	Chibuluma Mines plc (Metorex Ltd., ⁵ 85%, and Zambia Consolidated Copper Investments Holdings Plc, 15%)	Chibuluma South Mine, about 12 kilometers west of Kitwe	600,000 ore, which yields about 18,000 copper in concentrate.
Do.	Albidon Ltd.	Munali nickel mine, about 60 kilometers south of Lusaka	1,200,000 ore, which yields about 1,700 copper and 500 cobalt coproduct.
Metal	Konkola Copper Mines plc [Vedanta Resources Finance Ltd., 79.4%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 20.6%]	Tailings leach plant at Chingola	80,000 copper cathode.
Do.	do.	Nchanga copper smelter, Chingola	311,000 copper anode (blister copper), 3,000 copper-cobalt alloy.
Do.	do.	Nkana copper smelter	240,000 copper anode (blister copper). ³
Do.	do.	Nkana copper refinery, Kitwe	300,000 copper cathode.

See footnotes at end of table.

TABLE 2—Continued
ZAMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2011

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Copper and cobalt—Continued			
Metal—Continued	Mopani Copper Mines plc [Carlisa Investments Corp., ⁴ 90%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 10%]	Mufulira in situ leach and solvent extraction-electrowinning ⁶ plant	17,000 copper cathode.
Do.	do.	Mufulira (ISASMELT) smelter	200,000 copper anode.
Do.	do.	Mufulira refinery	275,000 copper cathode.
Do.	do.	Nkana solvent extraction plant	15,000 copper cathode.
Do.	do.	Nkana cobalt plant	2,400 cobalt metal.
Do.	Chambishi Metals plc [Eurasian Natural Resources Corporation PLC (ENRC), 90%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 10%]	Chambishi cobalt plant	27,000 copper cathode, 3,400 cobalt metal.
Do.	Chambishi Copper Smelting Company, Ltd. [China Nonferrous Metal Mining (Group) Company Ltd., 60%, and Yunnan Copper Industry (Group) Co. Ltd., 40%]	Chambishi copper smelter	150,000 copper anode (blister copper).
Do.	First Quantum Mining and Operations Ltd. (First Quantum Minerals Ltd., 100%)	Bwana Mkubwa solvent extraction-electrowinning plant, near Ndola	52,000 copper cathode.
Do.	Sable Zinc Kabwe Ltd. (Metorex Ltd., ⁵ 100%)	Sable copper leach and electrowinning plant at Kabwe	14,000 copper cathode, 600 cobalt carbonate.
Do.	Sino-Metals Leach Zambia Ltd. [China Nonferrous Metals Mining (Group) Company Ltd., Sino-Africa Mining Investments Ltd., NFC Africa Mining Plc, and China Hainan Construction Co. Ltd.]	Chambishi	8,000 copper cathode.
Do.	Kansanshi Mining plc [Kansanshi Holdings Ltd., ² 79.4%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 20.6%]	Kansanshi high-pressure leach and solvent extraction-electrowinning plant	250,000 copper cathode.
Gold, content of ore kilograms	do.	Kansanshi Mine	3,200.
Iron and steel, crude steel	Universal Mining and Chemical Industries Ltd. (Trade Kings Group)	Kafue	100,000.
Lead, metal, secondary	Pagrik Zambia Ltd.	Lusaka	1,000.
Lime, quicklime	Ndola Lime Company Ltd. [Zambia Consolidated Copper Mines Investment Holdings Plc (ZCCM-IH), 100%]	Ndola	300,000. ⁷
Manganese	Primarily small-scale miners	Mansa area, Luapula Province and Mkushi area, Central Province	120,000.
Nickel, Ni content of ore	Albidon Zambia Ltd. (Albidon Ltd., 100%)	Munali Mine, about 60 kilometers south of Lusaka	10,500.
Petroleum, refined 42-gallon barrels	Indeni Petroleum Refinery Ltd. (Government, 100%)	Indeni refinery at Ndola	3,500,000.
Sulfur:			
Pyrite ore, gross weight	Konkola Copper Mines plc [Vedanta Resources Finance Ltd., 79.4%, and Zambia Consolidated Copper Mines Investments Holdings Plc (ZCCM-IH), 20.6%]	Nampundwe Mine, 48 kilometers west of Lusaka	300,000. ³
Sulfuric acid	do.	Nchanga acid plant	675,000.
Do.	First Quantum Minerals Ltd.	Bwana Mkubwa acid plant, near Ndola	350,000.

Do., do. Ditto. NA Not available.

¹Subsidiary of Lafarge S.A.

²Subsidiary of First Quantum Minerals Ltd.

³Operations suspended. Facility on care-and-maintenance status.

⁴Carlisa Investments Corp. is owned by Glencore International plc, 81.2%, and First Quantum Minerals Ltd., 18.8%.

⁵Newshelf 1124 (Proprietary) Ltd.'s acquisition of Metorex Ltd. was expected to be completed in early 2012.

⁶Closed in 2009.

⁷Plant has the capacity to produce up to 5,000 metric tons of hydrated lime (slaked) from quicklime.