



2007 Minerals Yearbook

ZAMBIA [ADVANCE RELEASE]

THE MINERAL INDUSTRY OF ZAMBIA

By Philip M. Mobbs

Copper mining and refining dominated the mineral industry of Zambia, which also was a significant producer of cobalt and gem-quality amethyst, beryl, and emerald. In 2007, Zambia's mines accounted for 11% of total world cobalt output and 3% of copper production. Coal, a variety of mineral commodities for the construction industry, other semiprecious gemstones, gold, lime, silver, sulfur, and refined petroleum also were produced in Zambia. In 2007, soil sampling results indicated the existence of hydrocarbons in Zambia; however, the country has no crude oil or natural gas production and was dependent primarily on hydroelectric-generated electricity for most nontransportation power needs (Edelstein, 2008; Shedd, 2008).

The mining sector was regulated by the Mines and Mineral Act No. 31 of 1995 and amendments. Investment in most types of mineral operations were 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, were excluded. The Environmental Protection and Pollution Control Act of 1990 and its 1999 amendment addressed environmental issues, including those associated with the mining industry. Petroleum exploration and production were regulated by the Petroleum (Exploration and Production) Act No. 13 of 1985 and amendments, although the petroleum exploration legislation was expected to be updated in 2008.

The Ministry of Mines and Minerals Development updated guidelines for uranium mining in 2007. A new law concerning the production of uranium was expected to be enacted by early 2008. In 2007, the Government suggested that large mining companies allow the Copperbelt's unemployed miners access to commercially mined-out open pits and idle tailings dumps, which could allow miners to undertake small-scale mining operations legally, instead of continuing the current (2007) situation of illicit intrusions by miners onto unused properties (Times of Zambia, The, 2007).

Minerals in the National Economy

Mining and quarrying accounted for about 8% of the real gross domestic product in 2007. According to provisional data, cobalt and copper exports were valued at \$3.7 billion in 2007, and accounted for 79% of Zambia's merchandise exports. Other mineral and mineral-based exports, such as cement, coal, and gemstones, accounted for about 1% of merchandise exports (Central Statistical Office, 2007a, p. 6; 2007b, p. 6; 2007c, p. 6; 2007d, p. 6; 2007e, p. 6; 2008a; 2008b, p. 6; 2008c, p. 26).

Production

With the expansion of copper mine output and increased copper processing operations, refined copper production increased significantly, as did the recovery of gold and silver from copper ores. Refined petroleum products posted a 12% decline owing to an extended closure for maintenance of the

country's sole crude oil refinery. Data on mineral production are provided in table 1.

Structure of the Mineral Industry

Many of the country's large mining operations are located in Copperbelt Province in north-central Zambia. Uranium exploration was concentrated along the northern shore of Lake Kariba in southern Zambia. The Government retained minority interest in most of the large copper projects through its Zambia Consolidated Copper Mines Investments Holdings Plc. The mining sector was 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 oversaw the industrial manufacturing sector. Copperbelt Energy Corp Plc, which purchased most of its power from state-owned ZESCO Ltd., distributed electrical power to many of the larger mining operations. Data on the capacity and ownership of selected mineral operations are provided in table 2.

Commodity Review

On July 1, 2007, to allow for the digitizing and reorganization of the cadastre system (the Government's integrated land information system that contains geodetic, land use, property ownership, and topographic information), the Government instituted a 6-month moratorium on the acceptance of new applications for, renewals of, and transfers of mineral exploration and mining licenses. The computerization process (and anticipated simplification of licensing procedures) was expected to be completed in early 2008.

A number of exploration projects for cobalt, copper, diamond, semiprecious gemstones, gold, manganese, and uranium continued in 2007. Companies with exploration projects in Zambia included Africa Eagle Resources plc of the United Kingdom on the Sasare Eagle Eye copper gold prospect and the Lunga copper, gold, and uranium prospect; the joint venture of African Eagle and CGA Mining Ltd. of Australia on the Mkushi copper prospect; the joint venture of African Eagle and Copperbelt Minerals Ltd. of the United Kingdom on the Mokambo North and the Mokambo South copper prospects; the joint venture of African Eagle and Phelps Dodge Mining Ltd. of the United States on the Ndola copper prospect; and AIM Resources Ltd. of Australia on the Mumbwa copper and gold project.

Companies with exploration activity also included Albion Ltd. of Australia and African Energy Resources Pty. Ltd. on the Chirundu joint-venture uranium project (which included the Gwabe and the Njame deposits), the Kariba Valley joint-venture uranium project (which included the Chisebuka, the Munyumbwe, and the Namakande prospects), and the Luano Valley joint-venture uranium project; Aldershot Resources

Ltd., which sampled on their Kariba uranium project; Allied Energy Corp. of the United States, which evaluated the potential acquisition of the Starfield tin mine; Caledonia Mining Corp. of Canada, which drilled the Nama cobalt project; and First Quantum Minerals Ltd. of Canada, which explored the Kashime, the Luswishi, the Mpongwe, the Mwinilunga, and the Solwezi copper prospect.

Other exploration activity included Goliath Resources Inc. of Canada's work on the copper tailings dumps at Kitwe; ICS Copper Systems Ltd. of Canada's drilling of the Mokambo copper project; Kiwara plc (which was formed by the takeover of Kiwara Resources Ltd. by Wadhama Investments plc in August) of the United Kingdom's exploration of the Kalumbila cobalt-copper-nickel and the Kawanga uranium prospects; and Luri Gold Ltd. of Canada's drilling on the Luri Hills gold project (which included the Dunrobin and the Matala Dome deposits) and review of the Nambala iron deposit, which was located within the area covered by the Luri Hills mining and prospecting licenses.

OmegaCorp Ltd. of Australia drilled and started a prefeasibility study on its Kariba uranium project. Teal Exploration & Mining Inc. continued its evaluation of the Konkola North copper project, and the joint venture of Teal and Korea Zinc Company Ltd. continued negotiations concerning the treatment of copper ore, which was proposed to be mined from the Mwamabashi copper project. Zambezi Resources Ltd. of Bermuda explored the Chakwenga gold and the Mulofwe copper prospects of the Lusaka East project. A joint venture of Zambezi Resources and Glencore International AG of Switzerland drilled the Cheowa copper prospect; and a joint venture of Zambezi Resources and Lithic Metals and Energy Ltd. (which formerly was known as Zambezi Nickel Ltd.) explored the Mpande, Mulungushi, and the Oryx uranium prospects.

Metals

Copper.—In 2007, First Quantum Minerals Ltd. of Canada continued the expansion of its sulfide ore treatment capacity at the Kansanshi Mine. Commissioning of the expansion project, which would increase the mine's throughput to 12 million metric tons per year (Mt/yr) from a capacity of 8 Mt/yr, was expected to begin in mid-2008. The Kansanshi Mine was also able to process 4 Mt/yr of oxide ore. Also at Kansanshi, First Quantum's ongoing construction of a fourth 35,000-metric-ton-per-year (t/yr)-capacity solvent extraction-electrowinning (SX-EW) plant, which would increase copper cathode production capacity to 140,000 t/yr, was expected to be completed in 2008. The company completed a carbon-in-leach gold and silver plant, which would process stockpiled gold-rich concentrates and residue from the Kansanshi high-pressure leach facility. In 2007, 15.5 million metric tons (Mt) of ore and 24.9 Mt of waste were mined at Kansanshi. The Kansanshi SX-EW plant produced 93,249 t of copper cathode and the Kansanshi concentrator produced concentrates, which contained an additional 70,575 t of copper. Some of the concentrates were treated at the smelter of Mopani Copper Mines plc (First Quantum Minerals Ltd., 2008, p. 8, 17).

The Bwana Mkubwa SX-EW plant, which processed copper ore from First Quantum's Lonshi Mine in the Democratic

Republic of the Congo [Congo (Kinshasa)], posted a 50% decrease in output to 25,402 t of copper cathode, because of the decrease in production from the Lonshi Mine. Owing to the scheduled closure of the Lonshi Mine in 2008 because of the exhaustion of remaining ore reserves, First Quantum evaluated the feasibility of building a copper concentrate roaster on the property and the conversion of the Bwana SX-EW plant to a cobalt plant (First Quantum Minerals Ltd., 2007b, p. 2-3; 2008, p. 8, 24).

Movement of copper concentrate from First Quantum's Frontier Mine in Congo (Kinshasa) (which began production in 2007) to the smelter of Mopani Copper Mines in Zambia was affected by the temporary closure of the border between Congo (Kinshasa) and Zambia by the Governor of the Province of Katanga, Congo (Kinshasa) (First Quantum Minerals Ltd., 2007a).

The copper content of ore mined from the Konkola underground mine and the Nchanga open pit and underground mines, which were operated by Konkola Copper Mines plc, was 80,000 t in 2007. Copper cathode production from Konkola's Nchanga tailings leach plant and the Nkana copper refinery was 153,000 t. Work continued on the \$674 million Konkola deeps mining project, which was expected to increase the Konkola Mine's production capacity to 7.5 Mt/yr of ore from 2.4 Mt/yr. The new No. 4 shaft was to be sunk to 1,490 meters (m) and the No. 1 shaft was to be deepened to 1,490 m from 1,130 m. Initial production from the deepening project was expected to begin in mid-2009. The deepening project was also expected to dramatically increase the volume of water pumped from the mine to 430,000 cubic meters per day from 290,000 cubic meters per day. Operations at the Fitwaola Mine, which provided oxide ore to the tailings leach plant, were suspended in 2007 (Zambian Traveler, 2007; Shacinda, 2008a; Vedanta Resources plc, 2008, p. 8).

Konkola also was working on a \$372 million expansion of the Nchanga smelter, which would increase the smelter's capacity to 300,000 t/yr from 240,000 t/yr. In 2007, an outside arbitrator determined the price of Zambia Copper Investments Ltd.'s 28.4% interest in Konkola that Vedanta Resources plc of the United Kingdom had the option to acquire (Shacinda, 2008a).

Luanshya Copper Mines Ltd. planned to bring the 60,000-t/yr-copper-in-ore-capacity Mulyashi (also known as the Milyashi or the Muliashi) Mine into production in 2009, and to expand the production capacity of the Baluba Mine to 30,000 t/yr (copper-in-ore) from 24,000 t/yr. Additionally, the eventual commissioning of the proposed 6,000-t/yr copper-in-ore-capacity of the Mashiba prospect, which was at the feasibility study stage, was expected to increase Luanshya's total production capacity to about 96,000 t/yr (Shacinda, 2007a).

Chambishi Metals Plc, which processed ore (which contained cobalt and copper) from the Baluba Mine, as well as ore from the Nkana Mine of Mopani Copper Mines plc, expected to process ore from the Mulyashi Mine. Chambishi Metal's cobalt production declined to 2,100 t in 2007 compared with 3,400 t in 2006 owing in part to a furnace explosion in January and a suspension of operations in April after another accident with injuries. In late 2007, Chambishi, which was a subsidiary of Luanshya, was considering a proposal to expand the capacity of

its copper cathode plant to 40,000 t/yr from 27,000 t/yr (Chansa, 2007; Mwila, 2007a; Shacinda, 2007b; 2008c).

The commissioning of Mopani's copper smelter at Mufulira continued. Commercial production from the plant, which was designed to process 720,000 t/yr of copper concentrate, was expected to begin in 2008 (First Quantum Minerals Ltd., 2008, p. 25).

Chibuluma Mines Plc, which was a subsidiary of Metorex Ltd. of South Africa, completed the capacity expansion of the grinding mill at the Chibuluma South Mine to 600,000 t/yr, which resulted in an 11% increase in the tonnage of ore milled in 2007. Concentrate containing 12,642 t of copper was produced from 514,010 t of milled ore in 2007 compared with concentrate containing 9,896 t of copper that was produced from 463,494 t of milled ore in 2006. The copper processing complex at Kabwe, which was operated by Sable Zinc Kabwe Ltd. (which was a Metorex subsidiary), milled 542,994 t of copper concentrate imported from Ruashi Mining sprl (also a Metorex subsidiary) in Congo (Kinshasa). Sable recovered 9,175 t of copper and 391 t of cobalt (Metorex Ltd., 2007, p. 17, 19; 2008b, p. 2-3).

Equinox Minerals Ltd. of Australia started mining high-grade (about 1.09% copper) sulfide ore from the Malundwe open pit of the Lumwana Mine in April. Construction of the Lumwana concentrator continued in 2007; concentrate (about 43.3% copper) production was expected to begin in mid-2008. The Lumwana facility was designed to produce about 470,000 t/yr of copper concentrate from 20 Mt/yr of ore. The concentrate also would contain potentially-recoverable cobalt and gold, and sulfuric acid could be produced from the gas driven off during the smelting of the concentrate. In 2007, Equinox signed 5-year contracts to sell 230,000 t/yr of concentrate (about 100,000 t/yr of contained copper) to Chambishi Copper Smelter Ltd., which was expected to complete the construction of a 150,000-t/yr-output-capacity smelter at Chambishi in 2009, and 120,000 t/yr of concentrate (about 52,000 t/yr of contained copper) to Mopani Copper Mines plc, which operated a 250,000-t/yr-output-capacity smelter at Mufulira (Equinox Minerals Ltd., 2008, p. 11-12; undated; Mineweb Holdings Ltd., 2008).

Equinox expected that, with the development of the lower-grade (about 0.7% copper, which was expected to be concentrated to an average grade of 29.5% copper) Chimiwungo copper deposit in 2014 as an open pit, mining could continue at Lumwana for about 37 years. In addition to copper, the Chimiwungo and the Malundwe deposits contained uranium-enriched zones. Equinox planned to mine and stockpile ore from the zones separately to avoid contamination of the copper ore. A feasibility study of the onsite processing of the stockpiled uranium ore was expected to be completed in early 2008 (African Mining, 2007; Equinox Minerals Ltd., 2008, p. 11; undated).

Construction problems delayed the start of commercial production from the 1 megavoltampere electric arc furnace (EAF) at Ndola, which was operated by Triple Plate Junction Plc of the United Kingdom. Trial runs of the EAF smelted copper oxide ore to produce cobalt matte and copper anodes (Triple Plate Junction Plc, 2007, p. 2).

Manganese.—Red Rock Resources plc drilled, mapped, and sampled its Chiweuwe prospect, which was formerly

known as the Mkushi project. Additional work was proposed for adjacent (but not licensed) areas but was deferred until at least 2008 when the Government was expected to resume issuing exploration licenses. Red Rock had obtained a small-scale mining license for the prospect in 2006 and, in early 2007, awarded a contract to process Chiweuwe ore to Chimani Manufacturing Ltd., which was developing a ferromanganese plant at Kabwe. There was no apparent ore processing activity in 2007 (Mwila, 2007b; Red Rock Resources plc, 2007, p. 3; 2008, p. 3).

Nickel.—In April, Albidon Ltd. of Australia held a groundbreaking ceremony for the Munali nickel mine, which was located about 60 kilometers south of Lusaka. Initial production was scheduled for mid-2008, and the full production level of about 1.2 Mt/yr of ore was expected to be reached by the end of 2008. The facility's concentrator was scheduled to begin processing ore by mid-2008. Jinchuan Group Ltd. of China had agreed to acquire the mine's entire production of nickel concentrates. On an annual basis, the concentrate was expected to contain 10,000 t of nickel, 1,650 t of copper, 480 t of cobalt, and about 560 kilograms of platinum-group metals (Albidon Ltd., 2008, p. 8-11).

Zinc.—In 2007, Metorex completed the construction of a 4,500-t/yr-capacity heap leach and SX-EW zinc plant at its Sable processing complex. Because of declining zinc prices, the facility was converted to a cobalt leaching operation (Metorex Ltd., 2008a, p. 25).

Industrial Minerals

Gemstones.—In 2007, Gemfields Resources PLC of the United Kingdom acquired 75% equity interest in the Kagem emerald mine from Rox Ltd. and waived its option to acquire the Jagoda pink tourmaline mine from Jagoda Gems Ltd. Gemfields expected to suspend operations at the Mbuva-Chibolele emerald mine and to move its equipment and personnel to Kagem in 2008. Gemfields also explored the Kamakanga emerald prospect and other prospects in the Ndola Rural Emerald Restricted Area. Mayfair Mining & Minerals, Inc. of the United States and local partners continued development of an amethyst mining operation in the Mapatizya area. In December, the joint venture of Caledonia Mining and Motapa Diamonds Inc. of Canada allowed the exploration license for the Mulonga Plain diamond prospect to expire. The joint venture also was expected to allow the Kashiji Plain diamond license to expire in 2008 (Gemfields Resources PLC, 2008, p. 3-4; Motapa Diamonds Inc., 2008).

Mineral Fuels

Coal.—In Zambia, demand for coal as a heat and power source came from the alcohol brewing, cement, copper smelting, manufacturing, mining, and tobacco drying industries. The privately owned Collum Coal Mining Industries continued its expansion with the addition of a coal washing plant. Production from state-owned Maamba Collieries Ltd., formerly the leading coal mining operation in Zambia, dropped to about 19,000 t compared with 89,000 t in 2006. Maamba's debt load of about \$10 million restricted the company's ability to pay salaries and

to upgrade obsolete equipment. Flooding and power cuts also disrupted production (Times of Zambia, The, 2006; Shacinda, 2008b).

Petroleum.—In 2007, indications of natural gas and oil were noted during the testing of soil samples. The Government expected that international oil companies would be interested in pursuing additional exploration to determine if the indications might prove to be commercial deposits of petroleum.

Ideni Petroleum Refinery Company Ltd. was closed for maintenance for about 6 weeks in 2007, which resulted in an estimated 12% decline in output. During the shutdown, refined petroleum was imported from Mozambique, South Africa, and Tanzania.

Outlook

Zambia has many deposits and occurrences of metals. The mining industry, however, historically has been dominated by the copper sector. The surge in international mineral prices during the past few years has increased investor interest in ascertaining the economic potential of deposits of metals, such as cobalt, copper, gold, nickel, and zinc; industrial minerals and commodities, especially semiprecious gemstones and sulfuric acid; and mineral fuels and related materials, such as uranium.

Zambia faces several internal and external obstacles to successful and sustained mineral resource development; these include cyclical world commodity prices; high transportation costs; limited national infrastructure, particularly west of the Copperbelt; the cost of imported equipment and supplies; potential disruptions of electrical energy and fuel supplies, and the threat that high HIV/AIDS rates in the region pose to maintaining a skilled labor force.

The World Bank's ongoing Copperbelt Environmental Project is scheduled to continue until 2010. The \$42 million project is expected to continue to assist with the remediation of abandoned mine dumps and tailings dams that had been operated by the state-owned Zambia Consolidated Copper Mines Ltd., and to produce a consolidated environmental management plan that will provide guidance for the environmental management of the Copperbelt.

References Cited

- African Mining, 2007, Equinox commences uranium BFS at Lumwana: African Mining, v. 12, no. 3, May, p. 59-60.
- Albidon Ltd., 2008, Albidon annual report 2008: Perth, Australia, Albidon Ltd., 88 p.
- Central Statistical Office, 2007a, The Monthly: Lusaka, Zambia, Central Statistical Office, v. 48, March, 17 p.
- Central Statistical Office, 2007b, The Monthly: Lusaka, Zambia, Central Statistical Office, v. 50, May, 20 p.
- Central Statistical Office, 2007c, The Monthly: Lusaka, Zambia, Central Statistical Office, v. 52, July, 18 p.
- Central Statistical Office, 2007d, The Monthly: Lusaka, Zambia, Central Statistical Office, v. 54, September, 20 p.
- Central Statistical Office, 2007e, The Monthly: Lusaka, Zambia, Central Statistical Office, v. 56, November, 25 p.
- Central Statistical Office, 2008a, Real sector: Lusaka, Zambia, Central Statistical Office. (Accessed January 12, 2009, at <http://www.zamstats.gov.zm/real.php>.)
- Central Statistical Office, 2008b, The Monthly: Lusaka, Zambia, Central Statistical Office, v. 58, January, 20 p.
- Central Statistical Office, 2008c, The Monthly: Lusaka, Zambia, Central Statistical Office, v. 69, December, 27 p.
- Chansa, Melody, 2007, Chambishi Metals furnace explodes: The Times of Zambia, January 22. (Accessed January 15, 2008, at <http://allafrica.com/stories/200701221206.html>.)
- Edelstein, D.L., 2008, Copper: U.S. Geological Survey Mineral Commodity Summaries 2008, p. 54-55.
- Equinox Minerals Ltd., 2008, Annual report 2007: Perth, Australia, Equinox Minerals Ltd., 84 p.
- Equinox Minerals Ltd., [undated], Lumwana project: Perth, Australia, Equinox Minerals Ltd. (Accessed March 2, 2009, at <http://www.eqr.com.au/Development/Lumwana-Project>.)
- First Quantum Minerals Ltd., 2007a, First Quantum Minerals discusses DRC border closure: Vancouver, British Columbia, Canada, First Quantum Minerals Ltd., 1 p.
- First Quantum Minerals Ltd., 2007b, First Quantum Minerals reports operational and financial results for the three months ended March 31, 2007: Vancouver, British Columbia, Canada, First Quantum Minerals Ltd., 16 p.
- First Quantum Minerals Ltd., 2008, 2007 annual report: Vancouver, British Columbia, Canada, First Quantum Minerals Ltd., 76 p.
- Gemfields Resources PLC, 2008, Interim report six months ended 31 December 2007: London, United Kingdom, Gemfields Resources PLC, March 28, 22 p.
- Metorex Ltd., 2007, Annual report 2007: Saxonwold, South Africa, Metorex Ltd., 96 p.
- Metorex Ltd., 2008a, Annual report 2008: Saxonwold, South Africa, Metorex Ltd., 125 p.
- Metorex Ltd., 2008b, Consolidated unaudited interim results for the period ended 31 December 2007: Saxonwold, South Africa, Metorex Ltd., 8 p.
- Mineweb Holdings Ltd., 2008, Chambishi smelter to start up in January: Mineweb Holdings Ltd., December 30. (Accessed January 16, 2009, at <http://www.mineweb.com/mineweb/view/mineweb/en/page504?oid=75947&sn=Detail>.)
- Motapa Diamonds Inc., 2008, Motapa third quarter financial statements and interim MD&A: North Vancouver, British Columbia, Canada, Motapa Diamonds Inc, January 31, 2 p.
- Mwila, Ronald, 2007a, Chambishi copper/cobalt smelter ordered to shut down following accident: Mineweb Holdings Ltd., April 25. (Accessed January 15, 2008, at <http://www.miningweb.co.za/mineweb/view/mineweb/en/page36?oid=20041&sn=Detail>.)
- Mwila, Ronald, 2007b, Zambia contractor Chimam will process Red Rock's manganese ore: Mineweb Holdings Ltd., April 18. (Accessed April 19, 2007, at <http://www.mineweb.com:8080/mineweb/view/mineweb/en/page39?oid=19760&sn=Detail>.)
- Red Rock Resources plc, 2007, Report & financial statements for the year ended 30 June 2007: London, United Kingdom, Red Rock Resources plc, 28 p.
- Red Rock Resources plc, 2008, Report & financial statements for the year ended 30 June 2008: London, United Kingdom, Red Rock Resources plc, 40 p.
- Shacinda, Shapi, 2007a, Luanshya mine plans 96,000 t/y copper output: The Zambia Chronicle, October 10. (Accessed January 15, 2008, at <http://zambianchronicle.com/2007/10/10/luanshya-mine-plans-96000-ty-copper-output>.)
- Shacinda, Shapi, 2007b, Zambia's Chambishi to raise cobalt to 5,000 tonnes in 2010: Reuters Group Plc, September 28. (Accessed January 15, 2008, at <http://www.miningweb.co.za/mineweb/view/mineweb/en/page504?oid=37602&sn=Detail>.)
- Shacinda, Shapi, 2008a, Top Zambian copper miner increasing output, commissioning smelter: Thompson Reuters Corp., July 15. (Accessed July 15, 2008, at <http://www.mineweb.com/mineweb/view/mineweb/en/page36?oid=56747&sn=Detail>.)
- Shacinda, Shapi, 2008b, Zambia coal producer seeks rebound after '07 slump: Reuters Group Plc, January 18. (Accessed April 18, 2008, at <http://uk.reuters.com/article.oilRpt/idUKWEA745520080118>.)
- Shacinda, Shapi, 2008c, Zambia's Luanshya copper mine expecting higher output in 2008: Reuters Group Plc., January 11. (Accessed January 15, 2008, at <http://www.miningweb.co.za/mineweb/view/mineweb/en/page504?oid=44288&sn=Detail>.)
- Shedd, K.B., 2008, Cobalt: U.S. Geological Survey Mineral Commodity Summaries 2008, p. 52-53.
- Times of Zambia, The, 2006, Maamba Coal workers call off strike: The Times of Zambia, June 3. (Accessed November 17, 2007, at <http://www.times.co.zm/news/viewnews.cgi?category=6&id=1149940178>.)

Times of Zambia, The, 2007, 'Give ex-miners disused dumps': The Times of Zambia, October 27. (Accessed December 2, 2007, at <http://www.times.co.zm/news/viewnews.cgi?category=2&id=1193484028.>)
 Triple Plate Junction Plc, 2007, Annual report and accounts 2007: London, United Kingdom, Triple Plate Junction Plc, 27 p.

Vedanta Resources plc, 2008, Preliminary results for the year ended 31 March 2008: London, United Kingdom, Vedanta Resources plc, May 15, 40 p.
 Zambian Traveler, 2007, Konkola goes deep: Zambian Traveler, May/June. (Accessed August 29, 2007, at http://www.kcm.co.zm/latest_news_full.php?id=5.)

TABLE 1
 ZAMBIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity	2003	2004 ^e	2005 ^e	2006 ^e	2007 ^e
METALS					
Cobalt:					
Mine output, Co content	11,300	10,000	9,300	8,000	7,600
Metal, Co content	6,620	5,791 ²	5,422 ²	4,665 ²	4,435 ²
Copper:³					
Mine output, Cu content:					
By concentration or cementation	269,000	344,300 ²	341,000	370,000	370,000
Leaching, electrowon	79,000	82,600 ²	106,000	144,000	150,000
Total	348,000	426,900 ²	447,000	514,000	520,000
Metal:					
Smelter, primary, includes low-grade electrowon	268,000	280,100 ²	270,000	290,000	310,000
Refinery, primary:					
Electrowon	109,000 ^e	124,000	155,000	178,000 ^f	200,000
Other	241,000 ^e	286,000	244,000	240,000 ^f	300,000
Total	350,000 ^e	410,000	399,000	418,000 ^f	500,000
Gold kilograms	--	--	440	956 ^f	1,270
Silver ^e do.	--	--	2,000	3,500	4,500
INDUSTRIAL MINERALS					
Cement	350,000 ^e	390,000	435,000	650,000	650,000
Clays:^e					
Brick	3,000	3,300	3,300	3,300	3,300
Building, not further specified	30,000	33,000	33,000	33,000	33,000
China and ball	200	200	200	200	200
Gemstones:^e					
Amethyst kilograms	1,000,000	1,100,000	1,100,000	1,200,000	1,200,000
Beryl do.	8,000	8,000	10,000	10,000	10,000
Emerald do.	2,000	2,100	2,500	2,600	2,500
Tourmaline do.	25,000	26,000	26,000	27,000	27,000
Lime, calcined thousand metric tons	145 ^e	150	150	150	150
Limestone:					
For cement and lime do.	690 ^e	750	750	1,200	1,200
Crushed aggregate do.	600 ^e	650	650	700	700
Sand and gravel, construction ^e do.	200	220	220	300	300
Sulfur:^e					
Gross weight:					
Pyrite concentrate	226,000	280,000	285,000	290,000	290,000
Sulfuric acid ⁴	10,000	12,000	12,000	15,000	15,000
Sulfur content:					
Pyrite concentrate (42% S)	95,000	118,000	120,000	122,000	123,000
Sulfuric acid (32.6% S)	3,260	3,910	3,910	4,890	4,900
Total, S content	98,300	122,000	124,000	127,000	128,000
MINERAL FUELS AND RELATED MATERIALS					
Coal, bituminous	71,800	240,000	240,000	210,000 ^f	220,000
Petroleum, refinery products ^e thousand 42-gallon barrels	5,000	6,200	5,000	5,000	4,400

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^fRevised. do. Ditto. -- Zero.

¹Table includes data available through January 12, 2009.

²Reported figure.

³Terms used are as defined by the International Copper Study Group.

⁴From the Chambishi and the Nkana acid recovery plants.

TABLE 2
ZAMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement	Chilanga Cement plc (Lafarge Group, 84%)	Lusaka and Ndola plants	700,000.
Do.	do.	New plant at Lusaka	750,000. ¹
Do.	Zambezi Portland Cement Ltd.	Ndola	330,000. ¹
Coal, bituminous	Maamba Collieries Ltd. (Government, 100%)	350 kilometers south of Lusaka in the Kanzie and the Izuma Basins	800,000.
Do.	Collum Coal Mining Industries Ltd.	Sinazongwe	200,000.
Copper and cobalt:			
Ore and concentrate	Lumwana Mining Company Ltd. (Equinox Minerals Ltd., 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, 20.6%)	Kansanshi Mine	12,000,000 ore.
Do.	Konkola Copper Mines plc (Vedanta Resources plc., 51%; Zambia Copper Investments Ltd., 28.4%; Zambia Consolidated Copper Mines Investments Holdings Plc, 20.6%)	Nchanga open pit	4,500,000 ore.
Do.	do.	Nchanga underground mine	2,800,000 ore.
Do.	do.	Konkola underground mine	2,400,000 ore.
Do.	do.	Fitwaola open pit	NA.
Do.	Mopani Copper Mines plc (Carlisa Investments Corp., ³ 90%, and Zambia Consolidated Copper Mines Investments Holdings Plc, 10%)	Nkana Mine	5,500,000 ore.
Do.	do.	Mufulira Mine	2,500,000 ore.
Do.	Luanshya Copper Mines Ltd. (Enya Holdings BV, ⁴ 85%, and Zambia Consolidated Copper Mines Investments Holdings Plc, 15%)	Baluba underground mine	1,400,000 ore.
Do.	NFC Africa Mining plc (China Nonferrous Metal Mining Corp., 85%, and Zambia Consolidated Copper Mines Investments Holdings Plc, 15%)	Chambishi Mine	800,000 ore, which yields about 50,000 copper in concentrate.
Do.	Chibuluma Mines plc (Metorex Ltd., 65%, and Industrial Development Corp. of South Africa Ltd., 35%)	Chibuluma South Mine, about 20 kilometers from Kitwe	600,000 ore, which yields about 14,000 copper in concentrate. ⁵
Smelter and refinery	Konkola Copper Mines plc (Vedanta Resources plc., 51%; Zambia Copper Investments Ltd., 28.4%; Zambia Consolidated Copper Mines Investments Holdings Plc, 20.6%)	Tailings leach plant at Chingola	80,000 copper cathode.
Do.	KCM (Smelterco) Ltd. (Vedanta Resources plc., 51%; Zambia Copper Investments Ltd., 28.4%; Zambia Consolidated Copper Mines Investments Holdings Plc, 20.6%)	Nkana copper smelter	240,000 blister copper/anode.
Do.	do.	Nkana copper refinery	180,000 copper cathode.
Do.	Mopani Copper Mines plc (Carlisa Investments Corp., ³ 90%, and Zambia Consolidated Copper Mines Investments Holdings Plc, 10%)	Mufulira in situ leach and SX-EW ⁶ plant	17,000 copper cathode.
Do.	do.	Mufulira (ISASMELT) smelter ⁷	200,000 copper anode.
Do.	do.	Mufulira refinery	275,000 copper cathode.
Do.	do.	Nkana heap leach	38,000 copper cathode.
Do.	do.	Nkana cobalt refinery	2,500 cobalt metal.
Do.	Chambishi Metals plc (Enya Holdings BV, ⁴ 90%, and Zambia Consolidated Copper Mines Investments Holdings Plc, 10%)	Chambishi cobalt plant and Nkana slag dump	27,000 copper cathode, 7,000 cobalt metal.

See footnotes at end of table.

TABLE 2--Continued
ZAMBIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Copper and cobalt--Continued				
Smelter and refinery--Continued		First Quantum Minerals Ltd.	Bwana Mkubwa SX-EW ⁶ plant, which treats ore from the Lonshi Mine, Congo (Kinshasa)	52,000 copper cathode.
Do.		Sable Zinc Kabwe Ltd. (Metorex Ltd., 100%)	Sable copper leach and electrowinning plant at Kabwe treats feed imported from concentrates produced from the Ruashi stockpiles, Congo (Kinshasa)	14,000 copper cathode, 300 cobalt carbonate.
Do.		Sino-Metals Leach Zambia Ltd. (China Nonferrous Metals Mining Co. Ltd., Sino-Africa Mining Investments Ltd., NFC Africa Mining Plc, and China Hainan Construction Co. Ltd.)	Chambishi	8,000 copper cathode.
Do.		Triple Plate Junction Smelting Ltd. (Triple Plate Junction Plc, 90%)	Ndola copper smelter	800 copper anode.
Gold:				
Content of ore	do.	Kansanshi Mining plc (Kansanshi Holdings Ltd., ² 79.4%, and Zambia Consolidated Copper Mines Investments Holdings Plc, 20.6%)	Kansanshi Mine	1,000.
Lime, quicklime		Ndola Lime Company Ltd. (Zambia Consolidated Copper Mines Investment Holdings Plc, 100%)	Ndola	300,000. ⁸
Petroleum, refined	42-gallon barrels	Indeni Petroleum Refinery Ltd. (Total Outre Mer, 50%, and Government, 50%)	Indeni refinery at Ndola	3,500,000.
Sulfur:				
Pyrite ore, gross weight		Konkola Copper Mines Plc	Nampundwe Mine, 48 kilometers west of Lusaka	300,000.
Sulfuric acid	do.		Nkana No. 3 and No. 4 acid plants	380,000.
Do.	do.		Nchanga acid plant	180,000.
Do.		First Quantum Minerals Ltd.	Bwana Mkubwa acid plant	350,000.

⁸Estimated; estimated data are rounded to no more than three significant digits. Do., do. Ditto. NA Not available.

¹Under construction.

²Subsidiary of First Quantum Minerals Ltd.

³Carlisa Investments Corp. is owned by Glencore International AG, 81.2%, and First Quantum Minerals Ltd., 18.8%.

⁴Enya Holdings BV is owned by International Mineral Resources AG and Beny Steinmetz Group Resources.

⁵Also includes some cobalt content.

⁶Solvent extraction-electrowinning.

⁷Construction of the ISASMELT smelter that had a copper-in-concentrate input capacity of 720,000 metric tons per year (t/yr) was completed at Mufulira and commissioning began in late 2006. The ISASMELT smelter replaced the old 420,000-t/yr-copper-in-concentrate-input-capacity smelter at Mufulira that had an output capacity of 160,000 t/yr of copper anode.

⁸Plant has the capacity to produce up to 5,000 metric tons of hydrated lime (slaked) from quicklime.