

Zambia

The substantial improvement in base metal prices, and copper in particular, since the end of 2003 has led to considerable recent optimism amongst Zambia's business community. The country was granted debt relief under the enhanced Heavily Indebted Poor Countries (HIPC) framework and met its completion point in June 2005. The Government also continues to make progress with privatisation and budgetary reform. The current prospects for both the public and private sectors therefore appear more positive than at any time since the early 1990s.

Production of primary copper has continued to grow in line with the trend established following the privatisation of the larger copper mining companies in early 2000. Through the 1990s Zambia's economic development had been dominated by the secular decline in the purchasing power of its copper resources. This has now been reversed, which according to a recent World Bank report, risks an increased dependency on copper revenues to the detriment of economic diversification and the broader spread of the nation's international trade risks.

Despite these concerns the Zambian economy is diversifying strongly. The agricultural sector has benefited from privatisation and the migration of commercial farmers from neighbouring Zimbabwe. Tobacco production in 2005 is expected to reach almost 27 million kg of Virginia leaf compared with 12 million kg produced in 2004. Cotton production for 2005 will achieve in excess of 175,000 t, more than five times the level of 2001. Coffee production is also growing strongly on the back of increased prices for this commodity. Grain production has not seen similar growth yet, due mainly to lower prices and poor rainfall; however, this sector is also expected to perform well over the next few years.

According to the Export Board of Zambia, non-traditional exports registered an increase of 25% in 2004. Exports in monetary terms rose from US\$301.9 million in 2003 to US\$377.1 million in 2004 due mainly to increased export volumes of copper rods and cables, cotton yarn and lint, tobacco, sugar and fresh flowers.

Overall, the economy grew by slightly more than 5% in 2004 (target 3.5%) driven by better than expected performance in the mining, agricultural, construction and tourism sectors. Expectations are high for continued growth, and the target for 2005 is 6%.

The mining sector grew by 12.6% in 2004, up from 3.4% in 2003, driven by increased output and the considerably higher prices received for both copper and cobalt. The average price received for copper was US\$1.30/lb (2003 US\$0.78/lb) and for cobalt US\$22.30/lb (2003 US\$8.40/lb). Total copper production for 2004 increased to 421,000 t (see Table 1) although not all of this was from ores mined in Zambia. The most important minerals industry-related event of early 2005 has been the commencement of production from the Kansanshi mine operated by First Quantum Minerals Inc. First Quantum is estimating copper production of 91,000 t in 2005, rising to 147,500 t in 2006, and averaging 145,000 t/y over the period 2007-09.

During 2004 and early 2005, the established mining sector continued to transform and consolidate. In November 2004, Vedanta Resources plc acquired a majority shareholding in Konkola Copper Mines plc (KCM). Luanshya Copper Mines plc (owned by J&W holdings of Switzerland) acquired the Baluba mine and commenced production of a copper and cobalt concentrate from that ore source. A number of local mining companies are treating bought-in material from the Democratic Republic of the Congo (DRC). Preliminary data indicate, however, that total copper exports for the first half of 2005 are down on the previous year as a result of mining problems at some older mines as well as outages at the Nkana and Mufulira smelters.

Capital spending, as would be expected in the current buoyant base metal market, has increased. Mopani Copper Mines plc is constructing a new smelter at Mufulira and is currently commissioning oxide mining and treatment facilities at both Nkana and Mufulira.

KCM has committed to the construction of a 500 t/d acid plant (scheduled for commissioning in late 2005) to supplement feed to its tailings leach plant, and is contemplating the construction of a new Isa-smelt furnace at its Nkana smelter. Equinox Minerals Ltd has let the contract for the front-end engineering of the Lumwana Project near Mwinilunga, and there are a number of other mining projects either in the advanced engineering or bankable feasibility stage.

The mining industry remains well positioned to benefit from expected higher copper and (possibly) cobalt prices over the next few years. Production increases from existing mines on the Copperbelt have, however, been less dramatic than it would appear from Table 1. At least 50,000 t of finished copper production came from bought-in concentrates. These are essentially high grade, artisanally mined (and mostly hand-sorted) oxide ores originating from the DRC. It has been suggested that there are some 50,000 individuals engaged in artisanal mining activities in southern DRC. Trading in this material is highly organised, although it is difficult to see the practice continuing in the longer term since this activity has mostly negative social and environmental impacts and is therefore frowned upon by the international community.

Konkola Copper Mines

2004 was another poor year for KCM. Finished copper production was 191,700 t against a target of 225,000 t and this included some bought-in material from Chambishi mine and DRC. Production of leach cathode from the tailings leach project was once again constrained by shortages of sulphuric acid.

Underground operations at Konkola continue to be dogged by difficult ground conditions. Pumping (dewatering) costs are the highest on the Copperbelt and the inability to lower unit costs by increasing the production rate means that this remains a very high-cost producer.

The arrival of Vedanta Resources as the strategic equity partner in KCM has brought further, much needed, capital investment to the company. Vedanta has approved a number of capital projects including the Konkola Deep Mining Project (KDMP). Work has apparently commenced on revising the feasibility study for KDMP, which will include the sinking of a new production shaft. Construction of a 500 t/d sulphur-burning acid plant commenced in May 2005. This will provide additional feed for the company's oxide leach plants.

Mopani Copper Mines

During 2004, MCM produced 160,600 t of copper and 2,022 t of cobalt. Copper production from internal sources continues to be supplemented by the purchase of copper in high-grade oxide concentrate bought from DRC.

The company maintained its drive to lower costs, wherever feasible, whilst increasing production as indicated by an increase of 20% over the previous year's production figure of copper.

At Nkana, the piloting of the heap leach oxide material has been successfully completed and plans are under way to put infrastructure in place for production via a new SX-EW plant. At Mufulira, the construction of a full-scale in situ leach/SX-EW facility has been completed and the plant has since been commissioned.

Rebuilding of the Mufulira smelter commenced during 2004 and continues into 2005 along with oxygen and acid plants, which will be added at a total cost of US\$180 million. Sulphuric acid production will initially be 800 t/d, rising to 1,150 t/d in phase two. Some of this acid will be used in MCM's new oxide-leach operations, with the balance sold to other users in the region.

First Quantum Minerals

The Bwana/Lonshi operation is unique in that it operates across the international border between Zambia and the DRC. The operation involves open-pit mining of the high-grade copper-oxide ore at Lonshi in the Pedicle region of the DRC and transporting it some 35 km by road for processing at the Bwana Mkubwa Leach SX-EW facility in Zambia.

Bwana Mkubwa produced 41,546 t of copper in 2004, an increase of 41% over the previous year, and 6,554 t higher than the upgraded nameplate capacity. Also, 140,200 t of sulphuric acid was produced at the sulphur-burning acid plant, resulting in a cash cost (C1) of US\$0.46/lb, net of credits from the sale of 66,460 t of surplus sulphuric acid.

At the Lonshi open pit the company mined 669,000 t of ore averaging 5.5% acid soluble copper, and 11.03 Mt of waste.

The Bwana/Lonshi operation is expected to produce in excess of 45,000 t of copper cathode in 2005. C1 cash costs are expected to range between US\$0.50 and US\$0.55/lb of finished copper because high gangue, acid-consuming ores are being treated in 2005. During the first half of 2005 approximately 23,000 t of copper cathode were produced.

Commissioning of the Kansanshi operation has generally been completed, although some process and equipment de-snagging is still on-going. Production of copper concentrates is being constrained by the lack of available local and regional smelting capacity. To solve this problem the company has approved the addition of a pressure oxidation leach (POX) facility. A used POX plant has been purchased and will be installed and commissioned at Kansanshi in early 2006.

First Quantum is conducting a bankable feasibility study at its Frontier copper project near Sakania in the DRC. This is expected to be a sulphide copper flotation plant treating some 8 Mt/y of ore mined from an open pit. The current resource estimate at Frontier amounts to some 88 Mt averaging 1.17% Cu.

First Quantum continues to drill at the Kashime prospect 40 km north of Mkushi.

Chibuluma Mines

Chibuluma Mines plc's Chibuluma West mine ceased production on February 28, 2005 after more than 50 years of mining operations. Reclamation activities continued until the end of April. However, at the end of June pumping was stopped and the mine has been allowed to flood. The mine site will be rehabilitated as part of a formal closure programme.

The Chibuluma South Mine commenced underground mining operations in September 2004 at a small scale (around 7,000 t/mth). Ore was initially hoisted through the ventilation shaft owing to protracted delays in completion of the access portal and ramp to the uppermost operating level (71 m below surface). The ramp finally holed through in June 2005 and production is now scheduled to ramp up to around 20,000 t/mth by September 2005. The full production rate of 40,000 t/mth should be achieved in June 2006.

NFC Africa Mining

The Chambishi underground mine owned by NFC Africa, a subsidiary of China Non-ferrous Metals Corp, continued to produce some copper in concentrate during the year. This was supplemented by purchases of high-grade material from the DRC. Total concentrates sold contained 14,700 t of copper.

Other activity

Chambishi Metals plc produced 3,750 t of cobalt and 8,650 t of copper during the year. Most of the cobalt was produced from reclamation of the Nkana slag dump. Underground mining

operations continued at its Baluba mine, but have not yet reached targeted production levels.

Despite the significant improvement in the copper price since November 2003, there has not been a proportional increase in exploration activity. The former Avmin Exploration (Zambia) Ltd has been through a major restructuring exercise in preparation for a Canadian stock exchange listing as part of African Rainbow Minerals (ARM) in September 2005. ARM (Zambia) has flown Falcon gravity surveys over the Lusaka West and Kabwe areas, and anomalous targets at mineable depth have been identified. Follow-up, including drilling, is planned for the second half of 2005.

At the Eagle Eye iron oxide-copper-gold (IOCG) project in eastern Zambia, African Eagle Resources plc has begun an induced polarisation (IP) geophysical survey. Mapping and first phase drilling at this prospect indicates copper mineralisation extending over a strike length of at least 25 km and has also identified a new target at Ndomba.

In other parts of Zambia, exploration work is in progress at the old Dunrobin gold mine (Liuri Gold) and east of Lusaka at Chongwe (Zambezi Resources Ltd). Through its subsidiary, Zambezi Nickel Ltd, Zambezi is also examining nickel prospects at Paulwi Hill and Mitaba River.

| | 2002 | | 2003 | | 2004 | |
|---------------------------------|---------|-------|---------|-------|----------|-------|
| | Cu | Co | Cu | Co | Cu | Co |
| KCM | 222,010 | 2,039 | 187,500 | 1,150 | 191,700* | - |
| Mopani | 94,339 | 1,843 | 134,800 | 2,040 | 160,600* | 2,020 |
| Chibuluma Mines | 7,373 | 77 | 5,300 | - | 4,450 | - |
| Chambishi Underground | - | - | 8,500 | - | 14,700* | - |
| Bwana Mkubwa Mining | 11,878 | - | 29,513 | - | 41,546 | - |
| Chambishi Metals ¹ | 785 | 2,344 | 3,350 | 3,600 | 8,650 | 3,750 |
| Totals | 336,385 | 6,303 | 368,963 | 6,790 | 421,646 | 5,770 |
| * = Includes bought-in material | | | | | | |
| 1 = Own account | | | | | | |

About the Author

Martin Broome
African Mining Consultants Ltd
Tel: +260-2-211108
Fax: +260-2-211104
E-mail: amc@zamnet.zm
Web: www.amc.co.zm

Martin Broome obtained a BSc in Geology from the University of Wales in 1973 and a MSc in Engineering Rock Mechanics from Imperial College of Science and Technology, London in 1978. Mr Broome worked in various technical positions in the Zambian mining industry for 20 years before becoming a founding partner and managing director of African Mining Consultants Ltd (AMC) in 1994. He acts as consultant on mining operations and projects throughout Africa.

AMC has been providing mining and environmental consulting services to the mining industry since 1994. The company is affiliated to Golder Associates and specialises in African gold and base metal mines and projects. Originally set up to service the copper-cobalt mining industry in Zambia, the company now carries out mining and geological work all over the continent.