

ZAMBIA

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The honeymoon is finally over for Zambia's copper-mining industry. After 18 months of investment and re-expansion following the privatisation of the remaining major assets of the former Zambia Consolidated Copper Mines Ltd (ZCCM) in March 2000, the industry, and its key players, are once again contemplating a difficult and uncertain future.

It would have been unrealistic to expect Zambia to continue to buck the trend elsewhere in the world where low base metal prices since late 1997 have delayed several new mine developments and postponed all but the most financially robust expansion plans. A number of the world's major copper producers have announced the closure, downsizing or moth-balling of higher-cost

operations, or have modified production strategies in an effort to favourably influence the metal markets.

Until comparatively recently, however, Zambia seemed immune from such bad news and was enjoying the sort of mining industry growth not seen in the country since the 1960s. New mine owners were spending heavily on mine and plant rehabilitation. The first new mining operation in Zambia for 30 years, Chibuluma South was put into production by Metorex Ltd. Local and international contractors and suppliers of goods and services were enjoying commensurate business volumes. Zambia appeared poised to reap the benefits of re-investment and improving metal prices after several years of the copper price fluctuating at

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levels close to its all time low during the protracted ZCCM privatisation saga.

Things started to go awry early in 2001. Few would argue that the effort required to turn around the failing fortunes of the former ZCCM mining operations has turned out to be more difficult and financially demanding than was generally anticipated. The true extent of the deterioration in the condition of the mines and associated process plant only became evident to the new mine operators many months after they had taken ownership.

As if the operational and metal revenue problems affecting most of these businesses were not enough, a catastrophic slope failure in the South Wall of the Nchanga open pit in April 2001 caused the tragic death of ten employees. The failure severely curtailed production at this Anglo American-managed open pit, where full production was only resumed towards the end of the year. At Konkola, also part of the Anglo-led Konkola Copper Mines plc (KCM) group, technical and operational difficulties with finding and implementing a mining method suited to the low orebody dip and ground conditions at Konkola No.3 shaft led to production slow-downs and reserve losses.

Avmin's new Cosac smelter at Chambishi, built to treat cobalt-rich copper slag material from the Nkana slag dump some 35 km away, was originally scheduled for completion in October 2000 and eventually began commissioning in the first quarter of 2001. Various technical difficulties have caused a series of serious cost overruns and further delays in bringing the plant to full production, which is now only expected to be achieved in the final quarter of 2002.

Mopani Copper Mines plc, whose majority shareholders were Glencore International AG (46%) and First Quantum Minerals (44%), has had its share of problems turning around the old, relatively deep underground mining operations at Nkana and Mufulira. Significant investment in both underground equipment

and process plant rehabilitation has produced cost savings and some improvement in efficiencies. Difficult orebody geometry and geotechnical conditions continue, however, to pose tough challenges.

Both mines are losing money at current metal prices and the ambitious production targets set soon after investing have been revised downwards. In February 2002, the Mopani board sacked the senior mine management at Nkana and Mufulira and appointed a new chief executive. Subsequently, it has been announced that First Quantum Minerals have significantly reduced their equity in Mopani. It remains to be seen whether the new management team can make further cost savings and/or productivity improvements.

At Luanshya, the new operating company, Roan Antelope Mining Co. (Zambia) plc (RAMCO), was already in receivership at the beginning of 2001. Having defaulted on its supply debt and broken the terms of the Development Agreement with the Zambian Government the owner, Binani Group of India, had its Zambian mine assets re-possessed in the law courts. By April 2001, production was at a standstill. The lower levels of the Luanshya mine were flooded (due to a combination of heavy rain, poor maintenance and incompetent management), and the Baluba mine had ground to a halt owing to a lack of funds. Baluba has been on care-and-maintenance since then and by year end the Receiver was in negotiation with a number of potential buyers for the Luanshya and Baluba assets.

The Chibuluma South mine, owned by Chibuluma Mines plc (Metorex), was officially opened by President Chiluba on May 30, 2001, becoming the first new mine to be built on the Copperbelt since Baluba in 1972. The initial development of the deposit involved the open-pit mining of oxide and refractory ores for treatment through a leach plant and oxide concentrator. Problems were experienced with the design and commissioning of the leach-cement copper circuit and it quickly became apparent that the oxide copper

concentrate would not be suitable for blending with conventional sulphide copper concentrates treated in the two local smelters. With limited production, no market for its concentrate product and prevailing low copper prices, Chibuluma South was placed on care-and-maintenance in September 2001.

The Chambishi underground mine was purchased by NFC Africa Mining plc (a subsidiary of China Non-ferrous Metals Corp.) in July 1998. Despite many visits by Chinese mining and metallurgical experts, the purchase of a fleet of underground mining equipment and the partial refurbishment of the Chambishi concentrator, this mine is only scheduled to be in production in the latter part of this year.

Some successes in the face of difficult operating conditions and the depressed metal market have been recorded, most notably by First Quantum Minerals (FQM). FQM has begun the expansion of the leach SX-EW operations at its Bwana Mkubwa plant in Ndola and is mining high-grade ore from the Lonshi deposit (across the border in the Democratic Republic of Congo) to supplement plant feed. First Quantum has acquired the right to complete a bankable feasibility study on the Kansanshi copper-gold deposit in Zambia's North-Western Province. This study was begun in August 2001. Equinox Resources of Australia has commenced a US\$13 million bankable feasibility study on the Lumwana copper deposits near Kansanshi. The Lumwana study began in October 2001 and is expected to take 18 months to complete.

To crown a rather forgettable year, the announcement was made by Anglo American Corp. in January 2002 that "in the absence of substantial additional financing becoming available to KCM or the sale or transfer of assets on a going concern basis, it is anticipated that operations (at KCM) will cease in approximately 12 months".

Zambia therefore finished the year with more mining operations closed than was the case immediately prior to privatisation. Although

production increases were made at most of the mines still open, the larger mines missed their production target by some margin and the general mood had become increasingly gloomy, with the threat of possible closure of more Copperbelt operations unless economic conditions improve.

That said, there has certainly been significant recent investment into the industry. Most of the mines and process plants are in far better shape than they were two years before, and it will not take much of a rise in the copper price for many of the producers to be turning an operating profit. The Zambian mining industry is surely due some good fortune.

Konkola Copper Mines plc (KCM)

Copper production for the year ended December 31, 2001, was 196,805 t, 18% higher than in 2000 (on an annualised basis), but still well below the target of 240,000 t. The shortfall resulted from a major slope failure at the Nchanga open pit, delays in underground development at Konkola mine, and problems with the Nkana smelter.

Cobalt production for the year was on target at 2,400 t.

On October 12, 2001, Zambia Copper Investments (ZCI), whose 50.9% majority shareholder is Anglo American plc, issued a press release stating that, "in view of the outlook for the copper and cobalt price and the inability to raise the required limited recourse project finance, its operating company, KCM had advised the Zambian Government that it was unable to proceed with the Konkola Deep Mining Project".

On January 24, 2002, Anglo American made a further announcement that "in the absence of the Konkola Deep Mining Project, it could not justify providing funding to ZCI beyond that committed at the time of vesting of the former ZCCM assets."

By March 15, 2002, ZCI had provided US\$284 million to KCM out of its US\$310 million

commitment to the Zambian Government and other stakeholders. It further announced that in the absence of new financial facilities, KCM would fully exhaust its financial resources around the end of the first quarter of the year.

At the time of writing (April, 2002), negotiations were in progress with the government and other stakeholders in KCM, including CDC Capital Partners (7.5%) and the IFC (7.5%), on the future of the company. All these stakeholders are understood to have been “disappointed” with the way the withdrawal announcement was made. It is likely that negotiations on the way forward will be protracted, and it has been intimated by government that Anglo may face a substantial exit payment. The government has also stated that the operations of KCM “will not close”, and is understood to have sourced bridging finance from the World Bank. The preferred option for KCM is to find a suitable major partner to replace Anglo American. In the event that a suitable managing partner cannot be found, it may be possible to break up the various KCM assets for sale as individual business units, although this would lead to complications, particularly with regard to downstream processing.

Mopani Copper Mines plc (MCM)

MCM are the owners of the Nkana mine together with its concentrator and cobalt RLE plant; and the Mufulira mine, concentrator, smelter and refinery. During 2001, the company produced 83,161 t of copper and around 1,800 t of cobalt.

Significant progress has been made with the refurbishment of these facilities in the two years since privatization. However, in common with experience elsewhere on the Copperbelt, the turn-around has been slower and more expensive than was originally envisaged.

As a result of continued low metal prices, recent focus has been on cost reduction and improved mining efficiencies, and production is now being concentrated in those areas of the mines with the highest in situ metal grades.

During 2001, Nkana produced 45,818 t of LME grade copper cathode. A major investment is in progress to access the large (+80 Mt) resources in the Nkana Synclinorium which lie at the southern end of the Nkana basin. The upper portions of this structurally complex area are planned for production later this year. A study is also in progress to determine whether up-dip backfill mining methods can deliver better stope grades and higher recoveries from the relatively rich Mindola sub-vertical shaft area.

At Mufulira mine, production was 37,343 t of copper for the year. Increasing mining depth and lower orebody dips continue to hinder the attainment of high percentage extraction at low rates of dilution. The change over to shrinkage mining methods during 2000/2001 has not proved successful and a major strategic review of technical alternatives was initiated in February 2002.

Chambishi Metals plc

As part of the Zambian Government's privatisation initiative, Anglovaal Mining Ltd acquired the cobalt and acid plants at Chambishi and the Nkana slag dump from ZCCM during the latter part of 1998. The assets were placed in a new company called Chambishi Metals plc, 90% of which is owned by Anglovaal Mining, whilst ZCCM Investment Holdings Ltd retains 10%.

A new smelter, built to recover cobalt and copper from the Nkana slag dump began commissioning in the first quarter of 2001. Various technical difficulties with this expansion project have caused serious delays in bringing the plant on-stream. The furnace at this new plant had to be shut down twice during 2001 to replace part of the refractory lining. It will be shut down again during August-September 2002 to install a re-designed cooling system, after which it is expected that full production will be attained.

Anglovaal Mining has invested a total of US\$266 million to date in Chambishi. As a result of the problems with the new project,

and following a comprehensive review in January 2002, Avmin wrote down the value of its investment in Chambishi Metals plc by US\$176 million (100% basis). Chambishi's residual value following the write-down is US\$70 million.

Roan Antelope Mining Corp.

In February 2001, the old Luanshya mine was flooded. Heavy rains and silting up of the Luanshya dam were blamed for the event. However, the flood-control system, including two large, diameter pipelines across the Luanshya caving area, were non-functional and the blockage of the Luanshya Stream due to regular tailings spillages had adversely affected the ability of the local drainage system to divert storm water away from the mine. Once the mine started to take on large volumes of surface water, the pumping system, already in a poor state of repair, failed to cope and the lowest levels of the mine were flooded over a 10 km strike length.

The mine has since been dewatered and is currently on low-level care-and-maintenance. However, it seems unlikely that the Luanshya mine will resume large-scale production in the short to medium term.

At the trackless Baluba mine, most of the remaining copper-cobalt resources are contained in a low-dip area known as the Baluba Flat, which must be mined using mechanised backfill methods. In recent years, mobile equipment maintenance contracts were cancelled owing to non-payment by the owners, and production eventually ground to a halt in April 2001. The mine is currently on care-and-maintenance.

The Receiver is in discussion with a number of potential buyers for selected assets, although it remains to be seen which of these assets can be shown to be economically viable.

First Quantum Minerals (FQM)

FQM owns the Bwana Mkubwa tailings leach SX-EW facilities near Ndola which produced 9,662 t of copper during the year at a cash

cost, net of credits, of US\$0.18/lb. Over the past four years, Bwana Mkubwa has produced 34,574 t of copper cathode at an average cash cost of US\$0.13/lb, net of credits from the sale of some 223,556 t of surplus sulphuric acid.

FQM is currently expanding the Bwana Mkubwa facilities to treat high-grade ore from the nearby Lonshi deposit in the DR Congo. At full production, the plant will produce 30,000 t of LME grade copper cathode at a forecast cash cost of \$0.25c/lb.

In 2001 a second sulphuric acid plant was added, and acid production capacity has been increased from 105,000 to 145,000 t/y.

FQM's DRC subsidiary has been granted a mining concession for the Lonshi deposit under current Congolese mining law. Open-pit mining at Lonshi commenced in September 2001. By February 2002, an estimated 335,000 t of ore grading around 5% Cu had been mined and stockpiled. Processing of this ore, via blending with existing Bwana Mkubwa tailings, began in March 2002.

The Kansanshi deposit boasts 267 Mt of resources grading 1.28% Cu and is one of at least two major undeveloped copper deposits in Zambia's North-Western Province. Cyprus Amax completed over 80,000 metres of drilling at the prospect between 1997 and 2000. Following the acquisition of Cyprus by Phelps Dodge, FQM acquired an 80% interest in Kansanshi and is currently carrying out a bankable feasibility study on the deposit. The feasibility study is expected to be completed during the second half of 2002.

Chibuluma Mines plc

The Chibuluma West mine was the first of the Zambian mining assets privatised when it was sold to a consortium led by Metorex of South Africa in October 1997. Metorex's plan was to continue with production from the Chibuluma West high grade copper-cobalt resource whilst bringing the equally high grade Chibuluma South deposit into production.

Although production from Chibuluma West has progressed relatively well, the development of the Chibuluma South mine has been beset by problems.

The first ore from Chibuluma South was produced in April 2001 and by September approximately 100,000 t of oxide ore had been mined. Because of continuing low metal prices and the difficulty of blending the oxide concentrates with other Copperbelt products, mining has been stopped and the mine and concentrator are on care-and-maintenance.

The company's technical department is now examining fast track options to exploit the high-grade sulphide ore via a ramp access underground mine from the existing pit.

The Chibuluma West ore is railed to Nkana for processing on a toll basis. Production for the year was in line with estimates at 260,000 t containing 3.5% Cu and 0.11% Co. Current measured resources are sufficient to support two more years of mining although continuing exploration may extend the mine life beyond this.

NFC Africa Mining plc

Progress has been slow with the re-opening of the Chambishi underground mine, purchased by China Non-ferrous Metals Corp. in 1998. The mine has been on care-and-maintenance since 1987, and at the time of investing the annual care-and-maintenance cost was more than US\$2.5 million per year.

The company has purchased a fleet of underground mobile equipment from Atlas Copco and Tamrock and it is understood that extensive pre-production mine development was carried out on 600 m and 700 m levels and the main access ramp during 2001.

Reconstruction of the concentrator and construction of a backfill plant was started in January 2002. Both these plants are scheduled for completion by mid 2002. The backfill plant is being built adjacent to the old Chambishi open pit.

Ore production is expected to begin during the second half of 2002. This ore will initially be conveyed to surface for treatment. Saleable concentrate will be produced by the final quarter of the year. Production is forecast eventually to reach 6000 t/d.

Other Mining Operations

Away from the Copperbelt, mining and processing activities are relatively smaller scale. In the Ndola rural area, emerald mining continues, although it is poorly regulated and it is difficult to get reliable information about production levels or revenues. The largest operator, Kagem Ltd has three main pits and uses a contractor fleet of Caterpillar trucks and shovels. The Kagem operation is the nearest, in this area, to that of a commercially organised mining company, and could realise major cost benefits if conventional mine planning methods and geological controls were adopted and a modern beneficiation plant were installed.

At Kabwe, Sable Zinc Ltd has begun the reprocessing of tailings dumps from former ZCCM operations. The leach SX-EW plant was commissioned in September 2001 at a capital cost of around US\$3 million, and plans to produce more than 4,000 t/y of zinc metal.

The gold heap leach project at Dunrobin near Mumbwa remained closed during 2001, although the owner, Caledonian Mining was reported to be actively seeking a partner to redevelop this project.

Exploration Activity

In line with elsewhere in the world, exploration activity in Zambia by both majors and junior companies has seen a steady reduction over the past few years from the peak of the late 1990s. This is in spite of the recent completion of two major projects to capture digital and analogue data on the geology and mineral resources of Zambia funded by the European Union and the World Bank.

In 1999, Billiton (now BHP Billiton) closed its local office. Zamanglo and Avmin Exploration also advise that their exploration effort was

somewhat reduced during 2000 and 2001. However, Zamanglo will continue to focus its efforts on the Copperbelt and North-Western Province, and together with its JV partner, Equinox Resources, have reported good drilling results at the Ndola West prospect. The joint venture is also exploring for large tonnage, lower-grade copper deposits of the Lumwana type on the flanks of the Mwombezi Dome.

Avmin Exploration continued its search for near surface zinc deposits in its Kabwe licence areas and has also carried out limited drilling for base metals around Lusaka.

First Quantum Minerals appears to hold some of the most prospective exploration

ground in Zambia, having picked up the tenements formerly held by Cyprus Amax. These include areas of the North-Western Province where the Lufilian Arc re-enters Zambia under the cover of Recent sediments, as well as the ground contiguous with Kansanshi. Some of these areas were actively explored during the past year under a funding agreement signed with BHP Billiton.

Otherwise, gold and base metals exploration in Zambia is virtually at a standstill. Zambia's mining and exploration industry awaits better news from the capital markets and the metal price forecasters before an upswing in activity and increased expenditures are likely.