

## ZAMBIA

*By John Hollaway and Associates*

**O**n the 31 March 2000 the core assets of Zambia Consolidated Copper Mines Ltd (ZCCM) were formally privatised, and the transformation of the company from a state-controlled mining group with a 60% shareholding to a 100% state-held investment holding company was at last complete. The 27.3% minority shareholding in ZCCM held by Anglo American was bought out, for a consideration of US\$30 million (payable in six annual instalments), the name was changed to ZCCM Investments Holdings PLC ('ZCCM Holdings') and the technocrats and mine executives on the board were removed. The company is now controlled by senior government officials although the previous ZCCM chairman was retained in a non-executive capacity.

The benefits to Zambia have already been dramatic, with the copperbelt becoming a hive of activity as new mines and plants are developed and old ones restored to good health. Exploration has also reached a new high.

The original privatisation programme was scheduled to be completed by mid-1997, and a start was made with the sale of Roan Antelope (to India's Binani Group) and Chibuluma (to South Africa's Metorex) in October 1997. However, another attack of cold feet by the government led to the collapse of negotiations for the core assets, both with the 'Kafue Consortium' and the Konkola Deep Mining Project Consortium, whose members were a blue-chip cross-section of the world's mining industry. If the, in retrospect, generous offers made by these two groups for ZCCM's mines and prospects had been accepted, three years would have been gained and Zambia would have benefited by several hundred million dollars.

The International Monetary Fund's irritation with this attitude led to the cessation of balance of payments support by it in 1998 (although the small, and closed, Chambishi mine was sold to China Non Ferrous Metal Industries Engineering Construction Corp., the local company being conveniently abbreviated to NFC Africa Mining plc). By the end of that year ZCCM faced bankruptcy, and a frantic programme of retrenchments and cut-backs was commenced, coupled with an urgent new push to privatise.

Just in time, too. ZCCM's disastrous stewardship can be seen from the following table, from the time that the mines were nationalised in 1970.

While incompetence, overmanning and (in the latter stages) corruption were the direct cause of this fall, ZCCM was in turn drained of cash by successive fiscal regimes that moved the goalposts whenever the mines looked profitable. Over and above the normal taxes

Year	Output, '000t
1971	718
1976	712
1981	568
1986	514
1991	422
1996	321
2000	263

came a windfall tax, a mineral export tax and foreign exchange rationing.

ZCCM retained control of the Nkana smelter, refinery and acid plant through a wholly-owned subsidiary ZCCM (SmelterCo) Ltd. However, these are to be managed by Anglo American's Konkola Copper Mines plc (KCM), who have a five-year option to buy these units. This arrangement was brought about by the fact

<b>ZCCM Holdings Minority Interests</b>	
Konkola Copper Mines plc (KCM) (Nchanga and Konkola)	20%
Mopani Copper Mines plc (MCM) (Mufulira and Nkana)	10%
Roan Antelope Mining Corp. of Zambia plc (Ramco)	15%
NFC Africa Mining plc (Chambishi)	15%
Chibuluma Mines plc (Chibuluma)	15%
Chambishi Metals plc (Nkana slag heap)	10%
Cyprus Amax Kansanshi plc (Kansanshi)	20%
Copperbelt Energy Corp. plc (Power transmission)	20%

that KCM is not yet sure of the metallurgical requirements for their major Konkola developments. MCM has a second option on these operations. A grant of US\$81 million was made to the Zambian Government by the UK for a loan from it to ZCCM to rehabilitate these plants.

The last major asset to go was the Konkola North Mining Area, on which an option was granted to Avmin, of South Africa. ZCCM has the choice of taking a 15% or 20% interest in this if the mine is developed.

**Konkola Copper Mines plc (KCM)  
(Nchanga and Konkola)**

The assets now held by KCM are the Konkola mine, the Nchanga underground mine and open pits, the concentrators associated with these operations, the Nchanga tailings leach plant and the small Nampundwe pyrite mine. (The latter is away from the copperbelt, about 50 km west of Lusaka, and provides a source of sulphur at the Nkana smelter to enable a matte to be formed from the Nchanga oxide concentrates smelted there.)

At the time of the hand over, Nchanga and Konkola, including the Konkola Deep Mine Project (KDMP), had a measured and indicated resource of over 115 Mt at about 3.0% copper. Almost half of this will become available with the development of the KDMP. A further 50 Mt of inferred resources could be available for development later.

The final arrangement for the acquisition of Nchanga, Konkola and Nampundwe by Anglo American was for a cash payment of US\$30

million, a deferred consideration of US\$60 million and ZCCM's participation, to a maximum of US\$125 million, in a copper and cobalt price-related profits scheme. KCM also undertook to spend US\$208 million over the next three years and, subject to the availability of limited recourse finance, a further US\$523 million on developing the Konkola Deep mine.

In addition to ZCCM's 20%, KCM's ownership structure comprises 65% held by Zambia Copper Investments Ltd, Anglo American's longstanding vehicle for its copperbelt holdings, 7.5% by the International Finance Corp. (the commercial arm of the World Bank group) and 7.5% by the UK's Commonwealth Development Corp.

KCM also took over responsibility for the redundancy packages that would be due to any further employees laid off. However, this obligation was lightened by the fact that 3000 excess employees had been discharged immediately prior to the hand-over under a scheme financed by the International Development Association programme (ie donor funds administered by the World Bank). At the time of the change, therefore, KCM took responsibility for just under 10,000 employees plus another 1,500 at the Nkana smelter, refinery and acid plant.

In the nine months of its operations to the end of 2000, KCM produced 136,000 t of copper. This was below the target of 149,300 t, mainly because of limitations at the Nkana smelter. However, the operating costs were held down to the point where a cash operating profit was

achieved, despite heavy expenditure in development and spare parts.

Having consolidated, KCM is aiming for 240,000 t of refined copper production in 2001. In common with almost all the copperbelt mines, a major drilling programme is being undertaken as part of the process of restoring the reserve position. This has already brought benefits in the form of an extension of the life of the Nchanga open pit.

### **Mopani Copper Mines plc (MCM) (Mufulira and Nkana)**

While Anglo had made no bones about its desire to secure the main future resources of the copperbelt, particularly Konkola Deep, the core of the 'old' copperbelt, Nkana and Mufulira looked like attaining Cinderella status. Although they still produced over a third of Zambia's copper and most of its cobalt, efforts to market them were clouded both by their mature nature and by the controversy surrounding the sale of Roan Antelope mine to India's Binani group in Luanshya. With the sanctions from the IMF hurting, the final year of the privatisation process was marked by an almost desperate hurry to offload these assets.

Nkana came on stream in 1932 and has a resource of over 250 Mt of ore at grades of 2.2% copper and 0.1% cobalt. Mufulira, which started up a year later, has a resource of 71 Mt, at 3.1% copper. The limited exploration undertaken by ZCCM for the last twenty years means that both mines are still effectively open-ended.

The junior mining company Reunion Mining plc (since sold to Anglo) had earlier stuck its neck out and invested in the little Dunrobin gold heap leach near Lusaka. For this effort Reunion was offered Mufulira complete, with concentrator, smelter and refinery, but had trouble with financing the deal. Then the Polish parastatal copper mining company KGHM was offered the mine and then the Chilean copper parastatal was also approached. All these negotiations fell through.

After abortive discussions with half a dozen prospective operators, First Quantum Minerals of Canada was asked to consider the mine. First Quantum had gained favour by successfully developing the small Bwana Mkubwa tailings retreatment and sulphuric acid production operation. This 10,000 t/y operation is very profitable, the acid credits giving a net copper cost of only a few cents a pound. They were also able to find a financially strong partner, the Swiss trading company Glencore International AG.

The resulting company, Mopani Copper Mines plc, acquired the complete Mufulira division, plus the Nkana mines and the concentrator and cobalt plant there. As with KCM, the assets were transferred on March 31, 2000 (the end of the old ZCCM financial year). Here the financial arrangements were as follows:

- A cash payment of US\$20 million
- A 10% ZCCM Holdings retained interest (5% free, 5% payable)
- A deferred payment of US\$23 million
- An investment commitment of US\$159 million.

There is also provision for a price participation scheme, with a payment to ZCCM of 2% of the copper price when it goes above US\$0.85/lb.

Mopani mine's target for their first nine months of operation was 75,000 t of copper, 10,000 t of which was to come from Bwana Mkubwa. The actual achievement was 55,000 t but given the circumstances this was not unsurprising. (In 1999 Nkana and Mufulira produced only 40,000 t in the whole year). Some measure of the amount of catch-up work required underground is given by the 34 km of development drives and raises that were completed by early 2001. The plan is to raise output to 200,000 t a year by 2003, a figure last achieved in the 1970s.

### **Roan Antelope Mine (RAMCO)**

This is one of the oldest mines (1927) and its resources are relatively small and deep (45 Mt at 2.1% copper). Facing high costs and a

falling copper price, RAMCO reversed its commitment not to lay off staff and tried to reduce its labour force to 3,000 (from 6,000). The mine ran into cash flow difficulties, exacerbated by strikes, and was unable to pay its suppliers, in particular the newly-privatised Copperbelt Energy Corp. In the past such defaults would have been allowed to persist, funds eventually being found from ZCCMs treasury or government subventions. Under the new dispensation this did not happen, and the power was turned off to the mine in July 1999.

Some money was found and the mine restarted, but it again defaulted in 2000, with power being cut off in May and again in October. In November the mine was put into receivership, having produced little over 7,000 t of copper for the year plus 430 t of cobalt.

### **Chambishi Mine (NFC Africa Mining plc)**

The Chambishi South East Resource is the principal asset, estimated to contain 200 Mt at 1.95% copper and 0.082% cobalt. The mine was reported to have restarted in June 2000 with an initial ore treatment rate of 3,000 t/y, following a rehabilitation programme worth US\$39 million spent over the last two years. The intention is to produce 45,000 t/y of copper in concentrate for a total investment of US\$159 million, with full capacity planned to be achieved in mid-2003.

### **Konkola North (Konnoco (Zambia) Ltd)**

This prospect is estimated to hold a resource of 147 Mt, at 2.15% copper. It includes the existing Konkola mine's No. 2 shaft and is to the north of Anglo American's immense Konkola Deep resource. Konnoco (Zambia) Ltd is controlled by South Africa's Avmin, who acquired an option on this ore body. ZCCM has the right to hold either a retained share of either 15% or 20% (5% free carried in both cases) should Avmin's exploration result in a mine.

### **Chambishi Cobalt and Acid Plant**

Avmin acquired these plants together with the rights to the cobalt-rich Nkana slag dumps in

1998. The plant is a toll operation at a rate of about 2,500 t/y of cobalt and 10,000 to 15,000 t/y of copper.

In 1999, Avmin announced that it had begun construction of a new cobalt/copper plant specifically to treat the 20 Mt of slag at the Nkana smelter, with a cost estimated at US\$100 million. This slag, which runs at 0.76% cobalt and 1.06% copper, will be treated at a rate that will give a production of about 4,500 t/y of cobalt and 10,000 t/y of copper. The company is using a pyrometallurgical process to recover metal followed by a hydrometallurgical process to separate the cobalt and copper. The plant, representing the world's first commercial application of DC (plasma) arc smelting to recover metals from slag, began commissioning in October 2000.

### **Chibuluma Mine**

This small underground operation was sold to a consortium led by Metorex of South Africa in October 1997. The existing mine (Chibuluma West) had a hoisting capacity of half a million tonnes annually, with reserves of only about 800,000 t at 3.64% copper, and was envisaged as a 'bridging operation'; before Metorex developed a 40,000 t/mth open pit on the Chibuluma South orebody 12 km away. Drilling has now defined more ore at depth, and a further three to four years of life is envisaged, with perhaps further reserves being discovered during this period.

Stripping began on the Chibuluma South ore body – the first new copperbelt mine in Zambia since 1970 - in October 2000. This has a drill-proved reserve of 8.4 Mt of oxide and sulphide ore at an average grade of about 3.8% copper. The open-pit will have a life of four years at 40,000 t/mth. Thereafter underground mining will continue at the same rate.

A flotation concentrator has been built adjacent to the pit, with a tailings leach circuit on the end to recover copper by cementation during the two-year period when oxide ore is being treated.

### Other Mining Activity

Outside the copperbelt, gemstones are the most important mined product in Zambia. It is estimated that there are about 400 small-scale operations mining emeralds, amethyst, aquamarine and tourmaline. These are thought to be worth about US\$200 million in total, but the majority of the stones are smuggled out of the country.

The only significant formal gemstone mine is Kariba Minerals in the south of the country,

belonging to Lonmin. This was sold in May to a new London-based company, Kariba Gemstones Ltd.

Zambia's sole coal mine, the ageing Maamba Colliery, has been put up for sale by the privatisation agency. This has been limping along with an output of around 250,000 t/y, although the theoretical capacity is more than double this. There is a reserve of about 60 Mt.

Summary of ZCCM's Final Year Output		
	Year ended March 31, 1999	Year ended March 31, 2000
Copper		
Ore delivered to mill (t)	13,734,446	13,664,028
Contained copper (t)	324,905	353,297
Ore grade, % tot. copper	2.37	2.51
Primary production (t)		
Nchanga Tailings Leach Plant	54,840	56,027
Mufulira smelter	96,416	85,042
Nkana smelter	110,455	101,554
Nkana RLE plant	13,497	10,688
Chambishi RLE plant	10,217	3,973
Total primary production (t)	285,427	257,284
Toll primary	40,328	28,251
Total ZCCM primary	245,098	229,033
Finished production (t)		
Refined cathode	227,907	180,839
Anode rejects	0	593
Leach cathode	80,709	74,942
Anode scrap	1,613	6,763
Contained in concs. Sold	15,820	30,382
Total finished production (t)	326,049	293,517
Toll finished production (t)	70,097	30,855
Total ZCCM finished production	255,952	262,662
Cobalt (t) (includes toll and contained cobalt)	7,438	2,990