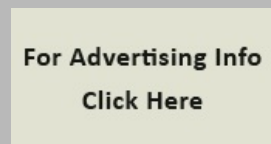




REPUBLIC OF MINING



Copper Expansion: The Copperbelt: the pride of Zambia - by John Chadwick (Publisher International Mining - June 2013)

June 6, 2013 in [Africa Mining](#), [Canadian/International Media Resource Articles](#), [Copper](#)

<http://www.im-mining.com/>

John Chadwick reports from Zambia's buoyant copper mining centre, where he worked many years ago.

The first thing I noted when flying into Ndola at the eastern end of Zambia's prolific Copperbelt was the town's proud new football stadium. It appears as a symbol of the accomplishments of the Copperbelt this century and its re-establishment as one of the world's top mining regions. Zambia is Africa's largest copper producer and the fourth largest in the world - and growing fast. Copper production has rocketed from 257,000 t in 2000, to more than 700,000 t in 2011 and about 650,000 t in 2012. Zambia's Chamber of Mines predicts output reaching 1.5 Mt by 2016 as a result of the many projects underway.

The road from Ndola to Kitwe (where I started my career in mining as a mining engineer) has been greatly improved and there are plans to improve it further all the way through Chingola and Chililabombwe to the Kasumbalesa border with the DRC as a two-lane highway. Kitwe is the heart of the Copperbelt and a vital centre for mining supplies and services with Zambia and into the DRC's Katanga Province.

On that road to Kitwe from Ndola, one first passes north of CNMC Luanshya Copper Mines, 85% owned by China Nonferrous Metals Co Ltd (CNMC) and 15% by ZCCM-IH. Luanshya is one of the oldest mines in Southern Africa. It was shutdown in 2008 at the height of the global financial crisis. CNMC reopened the mine in 2009 after extensive modernisation works. In April 2012 the \$368 million Mulishi Copper project was completed. The project extended the life of the mine and will produce over 41,000 t/y of copper up from the previous production of 21,000 t/y. There are three open pits, a heap leach plant and an agitation leaching plant that is reported to be the largest on the African continent.

Baluba mine near Luanshya has good cobalt grades and an estimated life of 20 years - 32.5 Mt at 2.48% Cu and 0.17% Co. CNMC has invested \$74 million in rehabilitating and replacing equipment and machinery. At Mopani's Nkana mine, where I first worked, I noted how Kitwe has spread out to the once isolated, out-of-town SOB shaft. And there is a new small open pit there, mining near-surface ore. But Mopani Copper Mines' (MCM) main project is the Mindola Synclinorium

project at Nkana. A \$320 million shaft project aims to access some 115 Mt of ore at 1.9% Cu and 0.09% Co. The project began in April 2012 and aims to increase Nkana's life by more than 25 years, well beyond the currently projected ore depletion dates of 2015, 2017 and 2018 for the current Mindola North, SOB and Central shafts, respectively. Also, the capacity of MCM's Mufulira smelter is being expanded in phases to 870,000 t/y of concentrate.

Chibuluma Mines is a modern mechanised underground copper mine owned 85% by Jinchuan Group Co and 15% by ZCCM. Chibuluma

is currently carrying out extensive exploration work that is expected to extend its mine life by several years and significantly increase its minable reserves of both cobalt and copper. The mine produces around 18,000 t/y of copper. Zhongui Mining Group owns the \$690 million Ichimpe project in Kalulushi that is due to go into production next year. Output is forecast to be 35,000 t/y copper and 2,000 t/y cobalt.

Going further east along the road, one hits Chambishi. NFC Africa Mining (NFCA) is also 85% owned by CNMC and 15% by ZCCM. NFCA has commenced the \$832 million development of its Southeast Orebody that will increase copper production to 100,000 t/y on completion. It was December 2010 when production commenced at Chambishi mine's West Orebody project, producing some 1 Mt/y over a life of 25 years. Total reserves are estimated at 45 Mt at 2.25% Cu.

ZCCM has 10% equity in Chambishi Metals, while Eurasian Natural Resources Corp (ENRC) owns 90%. Chambishi is a tolling and refining company with extensive copper and cobalt sources. The operation has undertaken several improvement and expansion projects that will streamline its operations and increase both the cobalt and copper production.

It processes feed from the ENRC's copper/cobalt operations in the DRC (the newly restarted Frontier mine and Boss Mining) as well as from third parties in the DRC. One major operational improvement has been the 90\$ million investment in a copper SX plant commissioned last year now producing grade A copper cathodes and looking for LME registration.

Chambishi has become a town of great interest to Chinese companies. In May 2011 the Zambia-China Economic and Trade Cooperation Zone (ZCCZ), the first such free trade zone to be established in Africa was declared by the governments of China and the Republic of Zambia. ZCCZ is composed of Chambishi MultiFacility Economic Zone (MFEZ) which covers an area of 11.58 km² and Lusaka East MFEZ which covers an area of 5.7 km². I also saw significant Chinese investment in and around Lusaka, prior to my departure; not least the large Golden Bridge Hotel.

At that time, 14 investors had been approved to set up business in the Chambishi MFEZ - NFCA, Sino Metals Leach (Zambia) (SML), Sino Acid Products (Zambia), Chambishi Copper Smelter Ltd (CCS), Chambishi Foundry and Rolling Steel, Fifteen MCC Africa Construction and Trade, Twapalwa Industrial, Golden Honesty Africa Development, Zambian Nonferrous Metals Exploration & Construction, Limian Service, Bolo Mining Investment, Sintra Company Ltd, AfriZam Timber and China Chemical Engineering Zambia.

CNMC and its subsidiaries are principally engaged in the mining, exploration, ore processing, leaching, smelting and sale of copper concentrate, copper cathode, blister copper and sulphuric acid. Its business is carried out through four subsidiaries in Zambia: NFCA, CNMC Luanshya Copper Mines, CCS and SML.

CCS (CNMAC 60% and Yunnan Copper Industry (Group) 40%) has a design capacity of 150,000 t/y of blister copper. The smelter started construction in November 2006 and commenced production by the end of 2008, at a total investment exceeding \$310 million. It currently has a capacity of about 150,000 t/y of blister copper (moving towards 200,000 t/y) and 340,000 t/y of sulphuric acid. By the end of 2013, CNMC's investment in Zambia will have exceeded \$2.5 billion.

Further west along the road (now deteriorating badly, despite government promises for improvement) in Chingola, in June 2012, European Union (EU) Head of Delegation to Zambia Ambassador Gilles Hervio said the high level of investments in fresh and clean technology at Konkola Copper Mines (KCM) is reassuring because mining is critical to Zambia's social-economic development.

"I have seen impressive quality on the social side. This is very useful for the country and should be emulated by other companies," he said referring to KCM's social responsibility (CSR) programs, through which it finances programs in education and health, sustainable livelihoods sport and biodiversity, among others.

KCM's total spend on CSR since Vedanta Resources took over the company in 2004 is over K450 billion and it is also the largest private sector employer in the country with more than 22,000 workers.

KCM operates the Nchanga smelter in Chingola, the only one in Africa and one of only three globally, which captures 99.6% sulphur dioxide. Part of the company's \$2.5 billion capital expenditure since 2004 has gone into mine expansions and putting up new concentrators and a refinery at Nkana, which are friendly to the environment.

KCM's Konkola Deep Mining Project (KDMP) aims to expand production of copper ore at Konkola underground mine in Chililabombwe from 2 Mt to 7.5 Mt/y by accessing the rich orebody that lies beneath where the current operations have been active. This involves the sinking of a new shaft to the depth of approximately 1,500 m, the deepest new shaft sinking project in Africa at the time. It has now been completed and development work on the expansion continues.

The company believes the KDMP represents the largest investment by a Zambian mining company in a shaft-sinking operation since the late 1950s and expects it to bring significant short and long-term benefits to the Zambian economy. The KDMP also includes the commissioning of a new 6 Mt/y concentrator at Konkola to enhance mining output, improve recovery and improve the concentrate grade of its copper.

KCM plans to invest \$200 million in an abandoned open pit which last produced copper in the 1970s. Since 2011, KCM had been carrying out activities at Mimbula including pit dewatering and studies to extend the Copperbelt power line to the site. Actual mining of ore could start in early April of next year. KCM has started trial mining at a separate project under its Nchanga underground operation where it had invested in modern mining methods to access ore from an upper orebody to extend mine life by more than 25 years from 2013, KCM Chief Executive Jayekumar Janakaraj said. "We expect to get 6,000 - 7,000 t of copper in the year 2013/2014 running from April - March."

KCM plans to invest an additional, approximate \$500 million in the next few years to expand its asset base and raise production to a targeted 400,000 t/y. Some \$200 million of this will be put into processing the stockpiles of CRO - Chingola Refractory Ores. Money will also be put into expanding the Nchanga underground mine and lengthening its life.

Smelting DRC concentrates KCM plans to import up to 30,000 t of copper concentrate from the DRC in the next few years

to enable its 311,000 t/y smelter to run at full capacity. However, Konkola Deep is the key to the smelter running at full capacity. Obviously some of the smelters mentioned above will also be looking for DRC concentrates and will have been concerned by reports in April of a ban on the export of concentrates from the DRC.

An industry source explains: "The vast majority of copper mining in the DRC is oxide which is easily accessible on the surface with Frontier mine the only major sulphide deposit currently in operation. The majority of oxide material is leached within the DRC or exported in small volumes, but the DRC lacks significant and modern smelters at present. Currently operating Zambian smelters, although targeting 100% internal feed, require third party concentrate supply [of varying qualities/quantities] to fill their smelters. In years to come this feed may come from Zambia, but with the addition of the Trident Smelter, DRC sulphide concentrate will prove vital for the Zambian smelting industry. Based only a few kilometres across the DRC border north of Ndola, Frontier mine - with full run production planned from July - could be seen as integral to the Zambian copper industry."

However, Congo's copper-rich Katanga province has said it will not implement the ban on unrefined copper and cobalt concentrate exports, as it doesn't have capacity to process all the ore itself. The order, signed by Mines Minister Martin Kabwelulu on April 5, gave companies 90 days to clear their stocks before the ban came into force. "Little by little, within the next three months, we need to no longer export concentrates," he said. Katanga's governor, Moise Katumbi, told Reuters on April 18 that the region simply lacks sufficient electricity to process all its unrefined products, so he would not enforce the restriction.

Lubambe at the end of the road to the DRC, just before the border, is the newest mine into production, and will be the subject of a forthcoming Operations Focus. Last October this mine, previously known as the Konkola North project, started production, ahead of schedule. It lies close to the town of Chililabombwe and includes an underground mine, a plant and related infrastructure. With a nominal production capacity of 45,000 t/y of copper concentrate, Lubambe is a 50-50 joint venture between African Rainbow Minerals (ARM) and Vale. Estimated capital expenditure was some \$400 million on surface infrastructure, underground development and the refurbishing of two shafts. The development process and the mine's ramp are expected to continue up to full production in 2015.

Busy First Quantum Kansanshi is the largest copper mine in Africa, 80% owned by Kansanshi Mining, a First Quantum subsidiary, and 20% by ZCCM. The mine is located approximately 10 km north of the town of Solwezi and 180 km to the northwest of Chingola.

First Quantum, which has just acquired Inmet, is very busy. Its multi-stage Kansanshi plant upgrade to an annual production capacity of 400,000 t of copper continues into 2013. The stage one oxide circuit expansion to 7.2 Mt/y was completed in Q2 2012 and optimised during Q3 2012 with the benefits being seen in the oxide throughput of Q4 2012.

Progress on the stage two oxide capacity expansion to 14.5 Mt/y continued with a phased commissioning commencing from mid-2013. The expansion encompasses additional crushing, flotation, leach tanks, CCD thickeners, SX-EW and associated ancillary systems and equipment. Acid supply and economics will dictate the rate of oxide treatment until the

smelter is commissioned in mid-2014 however the output of the five acid plants as well as the current volume of acid that can be externally sourced will allow for interim treatment rates of some 10 Mt/y.

The second phase of the 400,000 t annual production capacity expansion project is an expansion of the sulphide treatment facilities by construction of a new section of plant capable of treating up to 25 Mt/y of sulphide ore. Board approval has been granted for the project and construction of this new plant was planned to commence in the first half of 2013.

Kansanshi's concentrate is currently treated at smelters in Zambia; however, existing domestic smelting capacity will be insufficient to process the substantial increase in production resulting from the Kansanshi expansion and the Sentinel project. First Quantum's new copper smelter is designed to process 1.2 Mt/y of concentrate to produce over 300,000 t/y of copper metal. The smelter is also expected to produce 1.0 Mt/y of sulphuric acid as a byproduct at a low cost which will benefit Kansanshi by allowing the treatment of high acid-consuming oxide ores and the leaching of some mixed ores. The additional acid is also expected to optimise the expansion of the oxide leach facilities and allow improved recoveries of leachable minerals in material now classified and treated as mixed ore.

Detailed design works on the smelter are well progressed and all of the major equipment packages have been ordered. On site, earthworks construction was about 85% complete at the end of March and concrete pouring 20% complete. Mechanical installation commenced in January 2013. The project is scheduled for construction completion in mid-2014 followed by commissioning and ramp up. The Sentinel copper project is part of the Trident project which includes the Enterprise nickel project and several other exploration prospects. It is located some 150 km west of Solwezi. March 2012 saw a mineral resource and reserve estimate released for Sentinel. An estimated Measured and Indicated resource of 1,027 Mt at 0.51% Cu has been delineated, inclusive of estimated recoverable Proven and Probable reserves of 774 Mt at 0.50% Cu. The life of mine strip ratio is anticipated to be 2.2 and the estimated mine life is in excess of 15 years. An infill drilling program is identifying further detail of the geological resources that will be encountered during the initial years of operation.

The project is expected to produce between 270,000 and 300,000 t/y of copper in concentrate and construction activities

continued to ramp up in Q4 2012. Project capital costs were estimated at approximately \$1.72 billion with project completion expected during 2014. However a throughput increase from 40 Mt to 55 Mt/y, plus the addition of a nickel processing plant (Enterprise development) has been added to the project development which increased the total capital cost estimate to \$2.0 billion.

The maiden mineral resource estimate for the Enterprise nickel deposit has been identified at 40.1 Mt at 1.07% Ni. This supports Proven and Probable mineral reserves of 32.7 Mt at 1.10% Ni and based on a 4 Mt/y operation, the mine life would be approximately eight years producing 38,000 to 40,000 t/y of nickel. There is further potential to increase both the mineral resource and reserve as drilling continues in the adjacent Enterprise South West Zone. The Enterprise deposit lies some 12 km northwest of the Sentinel development. The longest lead equipment items, being the SAG mill and the ball mill, have been ordered and engineering design has commenced.

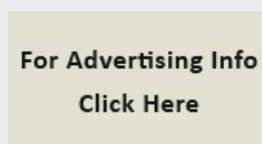
Barrick now owns the Lumwana mine that lies some 220 km northwest of the Copperbelt and 65 km from Solwezi. In 2012, Lumwana produced 179 Mlb of copper at C1 cash costs of \$3.07/lb and C3 fully allocated costs of \$4.62/lb. The mine is expected to produce 210-250 Mlb of copper in 2013 at C1 cash costs of \$2.70-\$3.10/lb and C3 fully allocated costs of \$3.20-\$3.60/lb. Barrick has prepared a new life-of-mine plan for Lumwana, which reflects information obtained from the exploration and infill drilling program that was completed in Q4 2012. The purpose of the drilling program was to better define the limits of mineralisation and develop an updated, more comprehensive block model of the orebody for mine planning purposes.

After this drilling was completed, the orebody did not meet the company's economic expectations. While the drilling increased reserves and defined significant additional mineralisation, some at higher grades, much of it was deep and would require a significant amount of waste stripping, which makes it uneconomic based on Barrick's expected operating costs and current market copper prices. "At higher copper prices, however, much of this copper will be economic and come into reserves and resources." Proven and Probable copper reserves at December 31, 2012 were 6,000 Mlb. IM

Share this:



Comments are closed.



Search...

Categories

- [Abitibi Greenstone Belt](#) (38)

- [Aboriginal and Inuit Mining](#) (2,028)
- [Aboriginal and Inuit Non-Mining Issues](#) (184)
- [Africa Mining](#) (1,241)
- [Aggregates](#) (11)
- [Alaska Mining](#) (51)
- [Aluminium/Bauxite](#) (119)
- [Anglo American](#) (165)
- [Art, Books, Music and Photography About Mining and Northern Topics](#) (117)
- [Artisanal Small-Scale Gold Mining/Mercury Problems](#) (5)
- [Asbestos](#) (81)
- [Asia Mining](#) (1,130)
- [Australia/New Caledonia/Papua New Guinea Mining](#) (939)
- [Barrick Gold Corporation](#) (404)
- [Battery Technology Storage Innovation](#) (40)
- [BHP Billiton](#) (361)
- [British Columbia Mining](#) (675)
- [Canada Mining](#) (3,166)
- [Canadian Media Resource Articles](#) (3,350)
- [Canadian Mining Hall of Fame](#) (60)
- [Canadian Mining History](#) (62)
- [Canadian/International Media Resource Articles](#) (3,034)
- [Caribou and Mining](#) (11)
- [Chromium/Platinum Group Metals](#) (412)
- [Cliffs Natural Resources](#) (140)
- [Climate Change, Carbon Taxes and ENGOS](#) (85)
- [Coal](#) (702)
- [Cobalt Town](#) (24)
- [Commodity Super-Cycle and Decline](#) (755)
- [Conflict Minerals](#) (72)
- [Copper](#) (497)
- [Corporate Social Responsibility](#) (262)
- [Critical, Strategic and Rare Earth Minerals and Metals](#) (98)
- [Deep Sea Mining](#) (8)
- [Diamond Mining](#) (316)
- [Elliot Lake](#) (21)
- [Emerald, Ruby, Sapphire, Gemstone Mining](#) (26)
- [Europe Mining](#) (414)
- [Falconbridge History](#) (10)
- [Forestry](#) (68)
- [Glencore](#) (417)
- [Gold and Silver](#) (1,714)
- [Goldcorp Inc.](#) (73)
- [Graphite Mining](#) (9)
- [Green Mining](#) (126)
- [Inco History](#) (66)
- [Industry Clusters for Economic Prosperity](#) (33)
- [International Media Resource Articles](#) (4,269)
- [Iron Ore](#) (912)
- [Junior Exploration Sector](#) (102)
- [Kirkland Lake](#) (49)
- [Labrador Iron Trough](#) (39)
- [Latin America Mining](#) (694)
- [Lithium](#) (75)
- [Manitoba Mining](#) (128)
- [Metals and Manufacturing](#) (39)
- [Mining Accidents, Deaths, Cave-Ins and Industrial Disease](#) (4)
- [Mining and Oil Sector Image](#) (363)
- [Mining Association of Canada](#) (55)
- [Mining Child and Slave Labour - Historical and Current](#) (2)
- [Mining Company History](#) (23)
- [Mining Conflict](#) (831)
- [Mining Documentaries](#) (82)

- [Mining Education and Innovation](#) (380)
- [Mining Environmental Accidents and Pollution](#) (325)
- [Mining Environmental and Water Shortage Issues](#) (163)
- [Mining History Global/General](#) (10)
- [Mining Labour Issues and History – Sudbury and Global](#) (348)
- [Mining Movies](#) (108)
- [Mining Power Issues](#) (271)
- [Mining Railway and Road Issues](#) (88)
- [Mining Supply and Services Sector](#) (194)
- [Mining Tourism](#) (22)
- [Mining Tragedies](#) (144)
- [Minnesota Duluth Complex and Iron Range](#) (150)
- [Nevada Mining](#) (43)
- [Newfoundland and Labrador Mining](#) (86)
- [Newmont](#) (17)
- [Nickel](#) (558)
- [Nickel Laterites](#) (246)
- [Nickel/Metals/ War – Geopolitical Flashpoints](#) (42)
- [Norilsk Nickel](#) (38)
- [North Bay](#) (98)
- [Northern Miner – Mining Person of the Year Award](#) (40)
- [Northern Ontario History](#) (182)
- [Northern Ontario Politics](#) (618)
- [Northern Ontario Separation and Alienation](#) (387)
- [Northern Ontario/Canada Regional Media](#) (1,530)
- [Oil and Gas Sector-Politics and Image](#) (1,430)
- [Ontario Economy](#) (169)
- [Ontario Far North Act](#) (90)
- [Ontario Mining](#) (2,598)
- [Ontario Mining Association](#) (313)
- [Ontario's Ring of Fire Mineral Discovery](#) (1,608)
- [PDAC](#) (101)
- [PDAC Award Banquet Inductees](#) (46)
- [Peat Energy](#) (18)
- [Potash/Phosphate](#) (259)
- [Quebec Mining](#) (496)
- [Red Lake](#) (42)
- [Resource Nationalism](#) (3)
- [Rio Tinto](#) (400)
- [SAMSSA](#) (88)
- [Saskatchewan Mining](#) (337)
- [Sherritt International Corporation](#) (17)
- [Space Mining](#) (44)
- [Stan Sudol Columns/Media References and Appearances](#) (207)
- [Steel and Stainless Steel Industries](#) (117)
- [Still to file](#) (123)
- [Sudbury Basin](#) (352)
- [Sudbury History](#) (112)
- [Sudbury Laurentian University – Mining Faculties and Research](#) (76)
- [Thompson](#) (65)
- [Thunder Bay](#) (251)
- [Timmins](#) (384)
- [United States Mining](#) (831)
- [Uranium](#) (263)
- [Vale](#) (817)
- [Women in Mining](#) (68)
- [X2 Resources](#) (27)
- [Zinc and Lead](#) (58)

