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Mumbwa Leapfrogs Ahead with BHP in Zambia



March 5, 2010 by [Dr. Willem Smuts](#)

Blackthorn Resources' joint venture partner BHP Billiton has elected to manage and fully fund the next exploration stage (phase 4) at the Mumbwa Iron Oxide Copper Gold (IOCG) project in Zambia.

Blackthorn mid-2009 engaged the MSA Group from South Africa as an independent consultant to conduct the mineral resource estimate, which is reported in accordance with the 2004 JORC Code. Using a 0.2% Cu cut-off, an in situ inferred mineral resource containing approximately 345 million tonnes at 0.47% copper and 0.06 g/t gold was estimated for the Kitumba anomaly, which covers an area of approximately 1 800 m by 400 m where drilling was focused, and modelled to a depth of 900 m from surface.

Data for the mineral resource estimate were collected from current and previous drilling campaigns and included 4 794 m from 25 cored drill holes and one reverse circulation drill hole.

Table 1 - Kitumba inferred mineral resource estimate - October 2009

anomaly	Category	Million tonnes (Mt)	Copper Cu %	Gold g/tAu g/t	Silver Ag g/t	Uranium U ppm
Kitumba	Inferred	345	0.47	0.06	1.38	45

The Mumbwa project area is located approximately 200 km west of Zambia's capital, Lusaka, and includes large-scale geophysical anomalies (magnetic, gravity and radiometric) which trend over a 25 km strike length across the project area. The Kitumba and the Mushingashi anomalies are the main target areas for exploration, with ongoing work being planned. The mineral resource at Kitumba is expressed on surface by a massive haematite replacement breccia system, with Cu and Au mineralisation spatially associated with faults and lineaments that crosscut the region.

Resource estimation methodology

Geological modelling was undertaken using Leapfrog 3D geological modelling software, considered highly suited to this type of complex deposit. Separate grade envelopes were generated at 0.15%, 0.25% and 0.5% Cu cut-off grades.

The generated envelopes followed the major and secondary structural and alteration trends recognised in the wireframes created in Leapfrog were manually truncated in areas where drilling data did not warrant further extrapolation. These truncations mark the areas where it is considered the resource is open ended. Wireframe solids were also created for breccia zones and for major alteration assemblages, both of which mirrored the mineralisation trends.

The geological model block dimensions were set at 50 m northing by 50 m easting, by 2 m RL, with sub-ceiling in the northerly and easterly directions, to conform to the drilling fence line-spacing and along-fence drill-hole spacing.

The mineral resource estimate was interpolated using Ordinary Kriging within Datamine software based on 2 m composited drill-hole samples into a model with a strike length of 1.8 km and a maximum depth extent of approximately 900 m below surface. The currently interpreted level of geological and grade continuity has placed the resource in the Inferred category.

South African based Venmyn Rand, an independent adviser of mineral project



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valuation and statutory compliance, did an independent peer review of the MSA resource model.

Further potential

Computer modelling of the mineral resource at Kitumba indicates that mineralisation is “open” at depth and towards the southwest, west and north-westerly directions.

Additional drilling over the area has the potential to increase the volume of and confidence in the mineral resource and further delineate the alteration halos, which are typical of IOCG style mineralisation. An increased understanding of the alteration trends may assist in targeting extensions to the mineralised system at the Kitumba anomaly.



Drilling

MSA has recommended some additional closer spaced drilling to increase confidence in the mineral resource estimate and potentially upgrade parts of the resource estimate into the indicated and measured categories. In addition, step-out drilling is recommended in order to potentially increase the size of the resource.

Additional drilling has the potential to increase the volume of and confidence in the Kitumba inferred mineral resource. However, a decision to carry out further drilling on the Kitumba anomaly during this phase will be made in the near future. The previous phase 3B drilling programme was suspended in September 2009, owing to the active presence of lions within the planned drilling area and the onset of the annual wet season.

Resources with varying cut off grades

The Kitumba resource model was interrogated over a range of copper cut-off grades to observe the trend in tonnage. Table 2 shows the tonnage variation using 0.0%, 0.2% and 0.5% copper cut-off grades.

Table 2 – Kitumba tonnage variation with range of copper cut-off grades

Copper cut off (%)	Million tonnes (Mt)	Copper Cu %	Gold g/t Au g/t	Silver Ag g/t	Uranium U ppm
0.00	571	0.34	0.06	1.45	44
0.20	345	0.47	0.06	1.38	45
0.50	87	0.94	0.05	1.27	37

Managing director Scott Lowe said, “This is a very important milestone for the Mumbwa project, as it demonstrates the developments being made in advancing the projects status. The work undertaken on the Kitumba anomaly represents only part of the project’s potential. There is additional work to complete on the neighbouring Mushingashi anomaly, and it is still too early to predict an outcome on that work.”

He added, “This is the first time Blackthorn Resources has been able to quantify a mineral resource at Kitumba, and the company is very pleased indeed with the magnitude of copper mineralisation on this anomaly alone. We are excited about potential for the future of the entire project.”

The table now set for phase 4

In January BHP has elected to manage and fully fund the next stage of exploration (phase 4) at Mumbwa. The phase 4 programme will include completion of a concept study to evaluate the exploration and development potential of the Mumbwa IOCG project.

The concept study will incorporate additional data collected in phase 4 from drilling the Mushingashi anomaly together with the inferred mineral resource estimated from the Kitumba anomaly. The total strike length of the Kitumba-Mutoya-Mushingashi anomaly is approximately 25 km, which includes the Mushingashi 'density' anomaly which trends north-south and extends for 19 km along strike.

It is planned to conduct a ground-based geophysical IP survey over the Mushingashi anomaly to assist in reviewing and selecting drill targets. Details of the IP survey are being finalised and BHP Billiton is currently selecting a geophysical contractor and finalising logistics for the programme. BHP expects that results from the IP survey would be available for confirming phase 4 targets prior to drilling.

The phase 4 programme will utilise two 'universal' drilling rigs capable of reverse circulation and cored drilling methods to test the anomaly. At the time of writing the location of 8 holes for 6,400m have already been pegged at Mushingashi. Additional holes are likely to be generated through the pending IP survey.

The final drill pattern will be based on design work currently being undertaken. Drilling will commence at Mushingashi with initial drill holes located near hole ZMMUM-008 which had revealed interesting IOCG mineral alteration in the previous phase 3B drilling programme.

The extent and characteristics of the alteration observed in ZMMUM-008 are indicative that the core of a broader IOCG system could potentially be located in the vicinity. A nearby hole, ZMMUM-009A, was drilled during the previous phase 3B programme and terminated at a depth of 122.8 m within a monzonite/diorite dyke.

BHP Billiton is in the process of finalising the selection of a drilling contractor to provide two drilling rigs for the phase 4 programme and the contract is expected to be finalised shortly. It is also expected that the selected contractor will commence mobilisation of its drilling crew in late March 2010 in anticipation of commencing drilling in April 2010 following the end of the wet season.

Mobilisation of drilling equipment in the field is also dependant on ground conditions, as access through low-lying, swampy areas may be problematic too soon after the wet.

After BHP's decision to move ahead Scott Lowe said: "We are very pleased that BHP Billiton has chosen to fund this phase of the project that will include a concept study. We are also excited about further exploration work being undertaken to assess the full potential at Mumbwa."

No time to sit idle

The wet season in Zambia is just that – wet – and it is practically impossible to carry out field work. In order to ensure no more time is lost to the big cats and working conditions are improved for the field teams, the wet season was used to make substantial improvements on site. These included the construction of a new core shed to store all core drilled from the Mumbwa project.

In addition, an upgrade of the accommodation camp has commenced and construction of demountable housing is in progress. Part of the camp upgrade also included an upgrade of a medical clinic and installation of improved satellite communication services.

A fully lined earthen dam was constructed to accumulate borehole water that is used to supply the camp and provide sufficient water for drilling services. As part of the wildlife management plan, the camp and dam have been fully enclosed by electrified fencing. Electrified fencing at drill sites as well as posting of armed rangers from the Mushingashi Game Reserve are also planned.

This article was originally published in the February issue of the [Inside Mining](#) magazine.

To view the photos relating to this article, please click on the following links:

1. [Kitumba Anomaly](#)
2. [Kitumba-Mutoya-Mushingash Anomalies](#)
3. [Kitumba NS Section Model](#)



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