

ORAPA KIMBERLITE CLUSTER DELIVERS A FOURTH MINE

The AK6 kimberlite project, essentially a joint venture between De Beers and AIM-listed African Diamonds (although a third company has a small share), is one of two 'greenfield' diamond developments in Botswana, the other being the Lerala mine of Australian junior DiamonEx near the Martin's Drift border post. While Lerala is ahead of AK6 in terms of implementation, AK6 is by far the bigger project. AK6 will be the fourth mine in the Orapa kimberlite cluster, joining Orapa itself as well as its two 'satellites', Letlhakane and Damtshaa.

The interesting point about AK6 is that it is re-discovery rather than a new discovery. It was first identified by De Beers in the late 1960s but was not considered to be an economic find because of its small size (3,3 ha) and low grade (3 cpht). It was only in the late 90s that it was revisited by De Beers, when improved technology revealed that the kimberlite was far bigger than originally thought with a much higher grade than initially estimated. The successful reassessment of AK6 has contributed to the current surge of diamond exploration in Botswana by both the majors and juniors (including Petra, Firestone and Tawana), the reasoning being that if the potential of AK6 was underestimated, so too might the potential of the scores of other known kimberlites in the country.

Says James Campbell, MD of Dublin-based African Diamonds: "The reassessment of AK6 revealed that its true size was closer to 10 than 3 ha and that the grade was not a paltry 3 cpht but rather a very respectable 22 cpht. So it immediately became of interest from an



economic perspective. If you ask why De Beers got the numbers so wrong in the late 1960s, the simple answer is technology. The exploration methods used then were fairly limited compared to what we have now, particularly in terms of geophysical techniques and drilling technology. For example, the low grade attributed to AK6 back then was a result of the cable tool or 'stomper' drilling technique which used a half-metre diameter drill bit which hammered on the bottom of the hole, in the process unfortunately smashing many of the diamonds. By contrast, when De Beers returned to AK6, it was able to make use of the newly developed 'reverse flood' technique, which uses a rotary rather than a percussive action and reduces diamond breakage from 50 to 70 % down to 5 to 10 %."

Campbell, a UK-trained geologist, talks with authority. Prior to joining African Diamonds a year ago, he had enjoyed a 21-year career with De Beers and, among other things, was for a period Personal Assistant to Nicky Oppenheimer. He ran the AK6 project for De Beers Prospecting Botswana from its inception in 1998 until joining African Diamonds, where he is now, so-to-speak, viewing the project from the other side of the fence. In his new position, he is working closely with Alex van Zyl, African Diamonds' Technical Director, who is also ex-De Beers and who led the team which discovered the Venetia deposit. Campbell and Van Zyl were in fact close colleagues

Left: Night drilling at the AK6 project using an Elephant rig. The rig drills 23 inch holes and, in effect, takes bulk samples from each hole it drills.

Below: This DMS plant at the exploration camp was used to process the bulk samples from AK6.



The De Beers Prospecting Botswana exploration camp in the Orapa area, which provided the base for the exploration of AK6 and other kimberlites within the Boteti licence area.



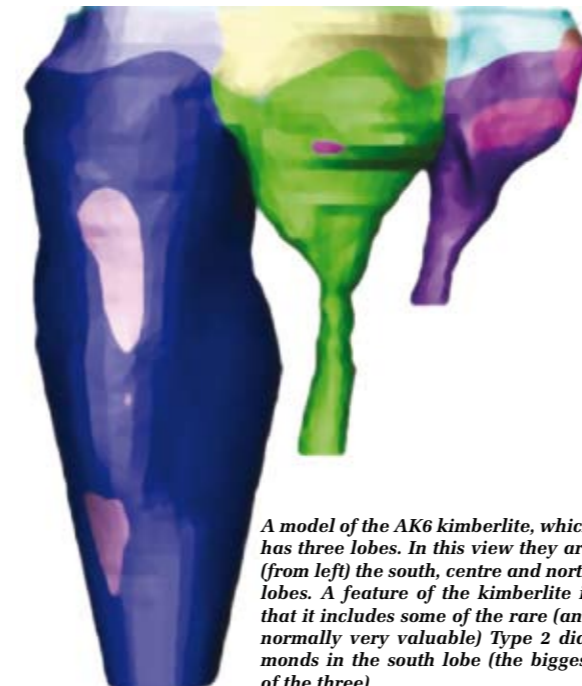
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James Campbell, Managing Director of African Diamonds (photo: Arthur Tassell).

at De Beers. Completing the triumvirate which runs the company is Executive Chairman John Teeling, an Irish mining entrepreneur who has a doctorate from Harvard. He was responsible for founding the company and steered its listing on AIM in 2003 and on the Botswana Stock Exchange in 2004.

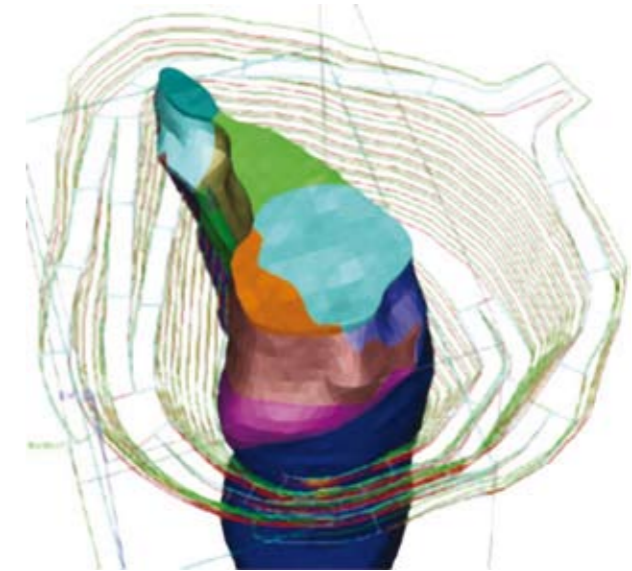
While there is a perception that AK6 is located on African Diamonds' ground, it has in fact always been in the De Beers' portfolio. The two companies decided to form a joint venture (JV) in 2004, as both had extensive tenements in the Orapa area. De Beers saw advantages in having access to African Diamonds' licences while African Diamonds was obviously attracted by De Beers' expertise and technology in diamond exploration (including its extensive database relating to the geology of the Orapa area) – and also,



A model of the AK6 kimberlite, which has three lobes. In this view they are (from left) the south, centre and north lobes. A feature of the kimberlite is that it includes some of the rare (and normally very valuable) Type 2 diamonds in the south lobe (the biggest of the three).

of course, its mining know-how and financial resources. The total area covered by the JV agreement is approximately 3 740 km². Of the 70 plus kimberlites in the Orapa area, the JV controls 34, with 21 of them located on ground held by African Diamonds.

Ownership of the JV – the JV vehicle is Boteti Exploration – was initially 49 % African Diamonds and 51 % De Beers, with De Beers' agreeing to fund the JV through to the completion of a Bankable Feasibility Study (BFS), at which point its shareholding would rise to 70 %. It was also stipulated that any large mines resulting from the JV would be operated and managed by De Beers with any smaller mines (those with an annual revenue of less than US\$70 million) being operated by African Diamonds. Since the conclusion of the JV agreement, a third company, Wati Ltd, a private Botswanan company, has entered the picture, as it holds what Campbell describes as "a slither of the southern limb of AK6". As a result of the BFS now being completed (and the inclusion of Wati in the ownership structure), the AK6 project is now



The opencast mine plan.

owned 28,38 % by African Diamonds, 66,22 % by De Beers and 5,40 % by Debwat, a joint venture between De Beers and Wati.

Diamond mining in Botswana has traditionally been the preserve of Debswana, the 50:50 partnership between De Beers and the Botswana government. Debswana owns and operates the country's four existing diamond mines, Orapa, Jwaneng, Lethakane and Damtshaa. The two new mines under development in the country, Lerala and AK6, will break this pattern, as neither will be in the Debswana stable. Clearly, however, there will be close cooperation between Boteti and Debswana, given De Beers' involvement in both entities and the proximity of AK6 to the Orapa mine complex. Certainly it is envisaged that the final recovery of AK6's diamonds will be undertaken by Debswana at Jwaneng. Comments Campbell: "Boteti has now submitted its mining licence to Botswana's Ministry of Minerals, Energy and Water Resources. In Botswana diamond mining licences are negotiated, particularly in respect of equity stakes and the fiscal regime. At this point we are still in the negotiation phase so the ultimate ownership of the AK6 mine is

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still uncertain, as the government may possibly elect to take a direct shareholding in the project.”

He adds that the Botswanan government has been very supportive of the project and that there seems little doubt that the licence application will be approved. This is expected to occur within the first three months of 2008. Boteti, which is already well advanced with detailed engineering, will then make an immediate start on construction, with late 2009 being the target for first production from AK6.

Since the JV was formed in 2004, exploration and assessment of AK6 has been intense. In 2003 and 2004, De Beers drilled 5 x 12 inch holes to obtain a 100-t bulk sample to test for macro diamonds while in 2004 and 2005 some 44 x 6,5 inch percussion holes covering 6 376 m were drilled to delineate the surface outline. In 2005 and 2006 a Large Diameter Drill (LDD) programme of 17 x 23 inch holes, using an Elephant rig (one of only three in the world) was completed which yielded 2 746 tonnes of material and over 10 000 diamonds. This exploration was followed by a Phase II programme initiated in 2006, including further large diameter drilling, with the samples being treated in a DMS plant on site, with diamond recovery at the De Beers Laboratories in Johannesburg. In 2007 a 12 000 tonne bulk sample was extracted from AK6 by Strata Mining of Francistown. The results from the exploration programme formed the basis for the BFS, which was completed in the latter half of 2007. This in turn allowed Boteti to submit its six-volume mining licence application in September 2007.

In its 2006 annual report, African Diamonds noted that some noteworthy drilling achievements were recorded during the exploration phase. A diagonal core drill hole went 884 m and intersected kimberlite nine times – both records for the De Beers group. Moreover, the Elephant rig drilled two holes deeper than 700 m in the south lobe of AK6, again a record.

The mining licence application envisages the development of an open-pit mine with production starting at an annual production rate of 2,7 Mt of kimberlite rising to 4,2 Mt in 2011. The first phase capital cost is estimated at US\$220 million (including project contingency). It is envisaged that the mine will produce approximately 1 million carats per annum when in full production. Operating costs for AK6 are estimated at US\$8/t and revenue at US\$30/t. Once operational, the mine will employ approximately 240 permanent employees for phase one of the operation, increasing to approximately 320 permanent employ-



John Teeling (left), Executive Chairman of African Diamonds, and Alex van Zyl, Technical Director, pictured at a mining conference in Botswana (photo: Arthur Tussell).

ees during phase two. During the construction phase, which precedes mining, employment levels are predicted to peak at approximately 1 500 people.

The mine will exploit a resource of nearly 40 Mt to a depth of 400 m estimated to contain 10 million carats. “As an open pit, AK6 has a mine life of 11 years,” says Campbell. “The pit will go down to about 350 m but the resource goes to 756 m, so clearly there is the possibility, indeed likelihood, that the mine will eventually go deeper. We estimate that there are over 22 Mt of kimberlite between 400 m and 756 m. There is also, of course, a reasonable chance that other pipes in the area – for example, AK8, which is within 10 km of AK6 – could emerge as satellite suppliers.”

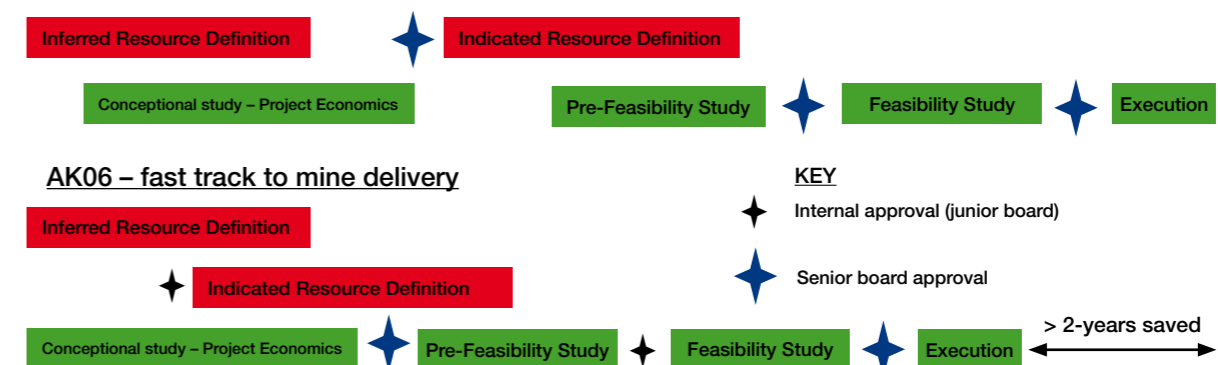
“Botswana is the best diamond address in the world. The Orapa area in Botswana is the best street within that address and the AK6 mine will be a fine new edifice on the best street. It really is as simple as that.”

– John Teeling in his Chairman’s statement in African Diamonds’ 2007 Annual Report

Parameters of the pit will include a bench height of 12 m and a ramp width of 28 m/25 m on the upper benches and 20 m on the lower benches. The stripping ratio over the life of mine will be 2 to 1.

Campbell points out that AK6 will be a significant mine in world terms, although admittedly it

TRADITIONAL



A feature of the AK6 project has been the overlapping of activities to save more than two years in the project development cycle.

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is dwarfed by Jwaneng and Orapa, which between them produce over 26 million carats a year and which rank as respectively the world's first and second biggest diamond mines. "AK6 will actually be very similar to Letlhakane, which is just 20 kilometres to the north-east, once in operation," he observes. "The geology is very similar, the mining methods will be comparable and the projected level of production is the same although revenues would be different. Letlhakane produces around US\$250 million years of gemstones and has been a consistent and successful performer for Debswana over more than two decades. The average price we expect for AK6's diamonds is US\$131 per carat, which translates into about half of Letlhakane's revenue." He notes that there are currently only 17 hard rock diamond mines operating worldwide, with several expected to close by 2012, and that this fact alone makes AK6 a noteworthy development.

While De Beers has provided the US\$40 million required to bring AK6 to its present stage, Campbell stresses that African Diamonds has by no means been a passive observer. "We did our own feasibility study on the project in parallel with De Beers, as we felt that this would be the best way for us to constructively interact with our partner," he notes. "In fact, the people who did our feasibility study – who operate as Paradigm Project Management – are ex-De Beers and were responsible for building major expansions at both Orapa and Jwaneng. I'm pleased to say that the De Beers project team took on board many of the ideas that we had in our feasibility."

Another interesting point is whether the influence of De Beers has speeded up the development of AK6. "Certainly African Diamonds has tried to push the project forward as fast as possible," says Campbell. "Whether De Beers would have moved as fast as it has without our influence is a moot point – it's really a question you would need to put to De Beers' itself. Whatever the case, there is no question that if get into production by 2009, then AK6 will have been developed at a very fast pace by the historic standards of the De Beers group."

As a mine, AK6 will be largely conventional. "Although we have done some pioneering with the exploration of AK6, the mine itself will break no new ground," Campbell says. "We will be running the traditional truck-and-shovel operation and the plant will be a standard kimberlite processing facility incorporating three stages of crushing, scrubbing, and dense medium separation, with final recovery via x-ray machines and a grease scavenging circuit. The only unusual aspect of AK6 is that the ore in the southern lobe is very dense and very hard. This will require special attention to the crushing and DMS circuits which will be customised to suit AK6's characteristics. One plus on the mining side is that there is no preliminary stripping required – the first cut will be straight into kimberlite. Additionally, we have no real infrastructural problems, given that the Orapa complex is already well served by communication and road links. Power, of course, is a concern, as it is all over Southern Africa, and this is the reason we are starting up at 2,7 Mt/a rather than going to 4,2 Mt/a immediately. Orapa is to get a significant upgrade to its power supply by 2011 and we will



Another view of the Elephant rig at work at AK6. It is one of only three such rigs in the world. It was developed by De Wet drilling of Botswana.

hopefully be able to use some of this capacity."

The mine will require approximately 6 600 m³ of water a day. This will be sourced from 16 pit dewatering boreholes which will be supplemented over time by a wellfield containing up to eight boreholes. The water reticulation circuit will include a 30 000 m³ dam which will store roughly four days' supply.

The commercial success of AK6, given the quality of the resource, the thoroughness of the BFS and De Beers' unquestionable operating skills, seems hardly in doubt. The question is, how widely will this success be spread in Botswana? Responds Campbell: "The interesting point about AK6 is that it will probably be the first diamond mine in Botswana in which ordinary citizens will have a very significant direct stake. Already we have the participation by Wati, which is owned by Botswanan interests. Over and above this, the listing of African Diamonds in Gaborone means that we have a growing shareholder base within the country. As we reported recently, Investec of Botswana recently acquired 7,6 million shares on behalf of investors and this represents just over 10 % of the company's issued share capital. We estimate, in fact, that over 300 Botswanan investors now hold in excess of 15 % of African Diamonds. This is an exciting development. It is rare in Africa for ordinary citizens to be able to participate in mining ventures and in this respect AK6 can probably be ranked as a pacesetter."

Report by Arthur Tassell, photos (unless otherwise acknowledged) courtesy of African Diamonds

Ak8 – a standalone mine or a satellite?

After AK6, probably the most promising of the kimberlites in the Boteti JV area is AK8, which could have the potential to be developed either as a standalone mine or as a satellite operation of AK6. It is 10 km from AK6 and the same distance from Orapa. The kimberlite has a southern lobe and northern/eastern lobe and extends over 5 ha. The resource amounts to 20 Mt to 300 m, with the average grade being an uninspiring 5 cpht. This is too low for a standalone mine but the southern lobe, some 2,5 ha in size, has a better grade ranging from 9 to 16 cpht and it is possible that a low-cost operation based on this lobe could be viable. The modelled diamond value is US\$60 per carat.