



Above: The small processing plant at the Tongo kimberlite dyke project in Sierra Leone.

Left: Panoramic view of the Baoulé site in Guinea showing the processing plant, stockpile and workshop.

Below: Mining kimberlite in the east lobe at Baoulé.

Stellar makes solid progress on West African diamond projects



Karl Smithson, CEO of Stellar Diamonds.

*With a positive Preliminary Economic Assessment (PEA) in place and the process of obtaining a mining licence well advanced, Stellar Diamonds plc is hoping to start development of its Tongo Dyke-1 project in Sierra Leone later this year (subject to the availability of funding). The company will also be making a decision in the second half of this year on whether to advance its Baoulé kimberlite open-pit project in Guinea, which is currently the subject of a trial mining programme, to the feasibility phase. Stellar's CEO, Karl Smithson, updated **Modern Mining's** Arthur Tassell on both projects at this year's Mining Indaba in Cape Town.*

The Tongo Dyke-1 project – located in Sierra Leone's Eastern Province in the Kenema District – has the great advantage that it can be fast-tracked into production, with surface mining in the first four years providing cash flow while a shallow underground mine is developed. Given that it is a fissure-type deposit, Tongo Dyke-1 is unlikely to ever support a huge mining operation and, in fact, the total

carat production over an 18-year mine life is estimated in the PEA at just 955 000 carats, with a peak yearly production of 85 000 carats. The economics of the project are nevertheless very robust. Adding to its appeal, the required capex to establish the infrastructure for both surface and underground mining is a modest – and manageable – US\$24,8 million.

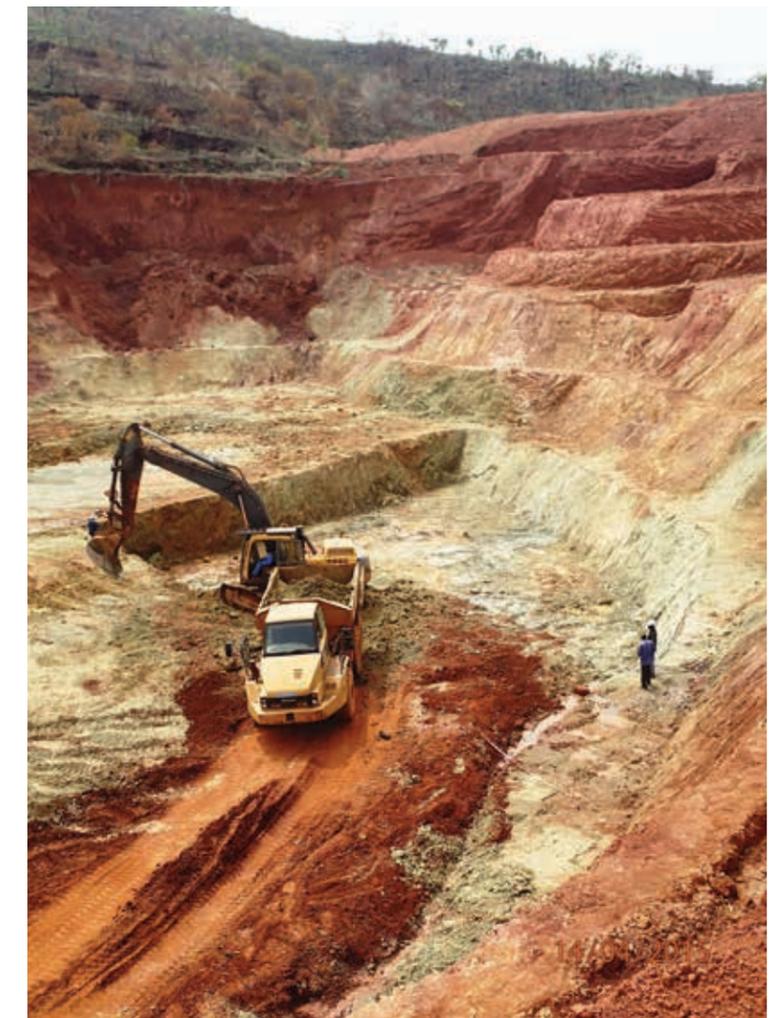
Smithson is highly enthusiastic about the potential of the project. "Dyke-1 has a grade of 165 cpht, which is well above average, and the

diamonds are expected to sell for an average of US\$270 per carat – which makes it one of the highest value kimberlites in the world in terms of the in-situ dollar per tonne value," he says. "In preparing our PEA on the project, we've erred on the side of caution and used the more conservative of two size distribution models we have for the resource – which estimates the grade at 120 cpht. On this basis, the project has a pre-tax NPV at a 10 % discount rate of US\$53,2 million and an IRR of 31 % with the gross revenues over the life of mine amounting to US\$387 million.

"The present mine plan is based on a JORC-compliant resource of 1,45 million carats for Dyke-1 to a depth of between 300 and 400 m, so there is plenty of scope for us to drill deeper and prove up additional resources," he continues. "Certainly, similar fissure mines in South Africa – Helam, for example – have operated to plus 700 m depth."

Smithson notes that there are a further three dykes on the Tongo licence which could add to the overall resource. "These three dykes – based on our exploration to date, which is ongoing – have indicated grades that are similar to – or even higher than – Dyke-1. So the bottom line is that the current mine life of 18 years could be extended significantly."

Interestingly, Tongo represents a virgin discovery by Stellar. "The informal diggers had



given the area some attention but Stellar – and its predecessor, Mano River Resources – can take the credit for identifying the fissures,” he says. Smithson, incidentally, is well known to the diamond mining community in Southern Africa, having worked earlier in his career for De Beers in South Africa, Botswana and Zimbabwe in a variety of roles including exploration manager in Zimbabwe.

It was originally envisaged that Tongo Dyke-1 would be an entirely underground operation, with the shaft and associated infrastructure required taking up to two years to develop before first production and cash flow. This presented problems for Stellar, a junior with limited resources. “We decided to look at options to accelerate the start of production and asked our consultants, Paradigm Project Management (PPM) of Johannesburg, to assist with this exercise. They analysed a number of mining methods and concluded that surface mining to supplement the underground mine was both technically feasible and economically viable.”

The method for surface mining recommended by PPM and accepted by Stellar is the unusual technique of manual slot or open bench stoping. Comments Smithson: “The method is extremely safe. It also allows us to mine from surface to a depth of 40 m and deliver ore simultaneously from a number of mine faces and depths along strike. Moreover, it involves no additional capex as compared to underground mining only.”

In terms of the surface mining plan, a total of three mining pits each of 500 m length along the 2 km strike of the orebody will deliver 100 000 tonnes of ore and 120 000 carats over the first four years of mine operation, primarily

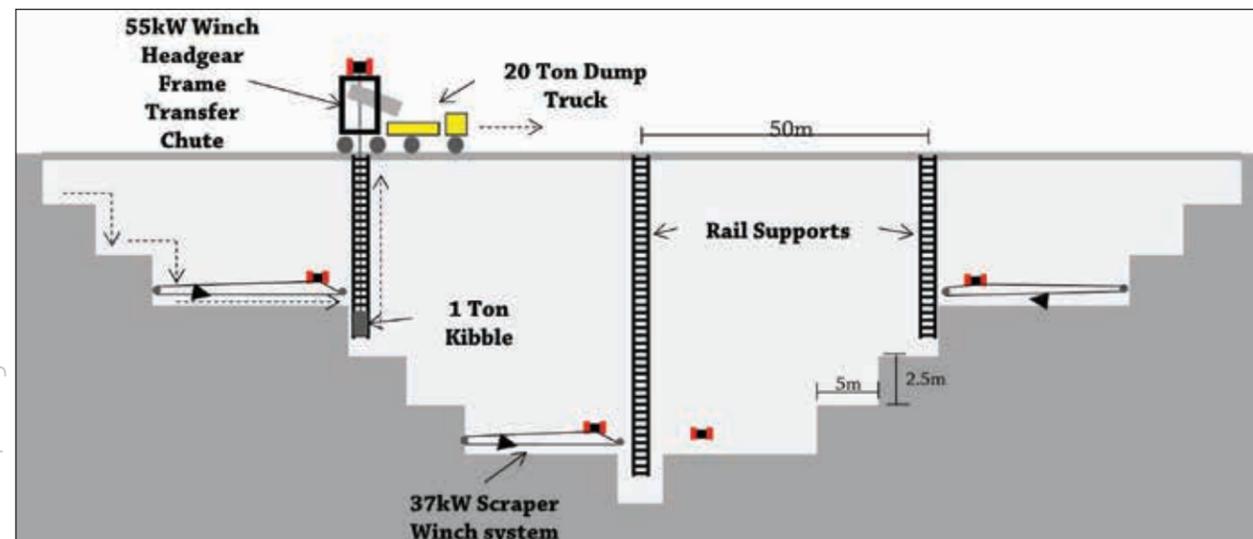
between years two to four. Two stopes with multiple mining faces of 2,5 m vertical height are envisaged per mining pit. The ore will be drilled and blasted from the mine faces, then hoisted to surface via rail-mounted 1-tonne kipples and transported to the processing plant. Each pit will be adequately de-watered and ventilated as mining progresses to depth.

The start-up of the underground mine will overlap with the surface mining with production extending from year 3 to year 18. In all, 838 000 carats will be produced by the underground mine. Access to the orebody will be provided by a 300 m vertical shaft with mining levels at 40 m intervals.

According to Smithson, the Tongo Dyke-1 project is now ready to roll. “We’ve done all the technical work needed and we’re now focusing on securing our mining licence. Once that’s in place, then it becomes a funding issue – we’re definitely going to need an element of debt,” he explains. “Our licence application is currently being processed by the National Minerals Agency and we’re optimistic that it will be granted shortly. The government is very supportive of the project which will ultimately employ around 300 people in an area where formal sector employment opportunities are extremely limited.”

Stellar is as much a mining company as an explorer and is proposing to own mine at Tongo. Its past experience as a mine operator includes the mining of the Mandala alluvial deposit in south-east Guinea from 2009 to 2011, an exercise which produced 128 000 carats. In addition, its trial mining operation at Baoulé in Guinea is a relatively substantial undertaking, with the plant complement on site including four excavators and a number of 25-t and 30-t

Bench stoping mining from surface to 40 m depth will be used to get Tongo into early production.



The Baoulé 100 t/h DMS plant is able to treat both fresh and weathered kimberlite ore.

articulated dump trucks (which were all transferred over from the Mandala site, along with a 100 t/h DMS plant able to treat both fresh and weathered kimberlite ore).

Discussing the prospects for Baoulé, which is located in the famous Aredor diamond district, Smithson says it potentially has a bigger resource than Tongo. “Baoulé is a 5 ha pipe which was discovered in the late 1990s by a Canadian company,” he states. “We acquired the project with a local partner roughly three years ago and the work we’ve done since then – combined with the results of exploration results from previous operators – points to a 22 Mt resource to a depth of 300 m containing 3.3 million carats. This is only an internal estimate and we’re now well advanced with our trial mining evaluation process which will allow us to determine with confidence the grade and diamond value of the pipe.”

The trial mining programme – which is essentially self-funding – was launched in November 2014 and has been on-going since then (with a break for four months in the second half of 2015, mainly as a result of the rainy season). The objective is to process and extract up to 100 000 tonnes of kimberlite. As of late February this year, the programme was about 70 % complete with just over 8 000 carats having been recovered at a 1,25 mm cut-off, giving an average grade of 12,7 cpht.

“One of the things we’re trying to establish with the trial mining is whether Baoulé has the capacity to deliver large stones on a consistent basis,” comments Smithson. “Certainly the Aredor district has a reputation for producing big stones from alluvial deposits with the biggest – according to the available records – being a 284,96-carat diamond recovered in 1993. Thus far we’ve recovered 610 stones at Baoulé greater than 1 carat including numerous gem diamonds up to 12 carats. Our biggest stone to date is a 55-carat diamond which we’ve just

recently recovered and which we’re still assessing. It appears to have a ‘boart’ exterior which potentially encapsulates a better diamond internally. Overall, we’ve been encouraged by what we’ve seen and believe Baoulé could well be the source of the large diamonds that have been recovered from alluvial operations.”

Smithson says the trial mining will continue till about mid-year. “At that point we will assess the results and decide whether to proceed with the project. Our target carat value for the project is US\$200. The latest – May 2015 – average sale price is US\$156/carats but we think that we could reach the target figure if there are enough high quality larger stones. If we do decide to advance the project, then we’ll need to look at doing a full BFS as the estimated capital requirement to establish a commercial mine is probably going to be in the region of US\$50 million and we’re not going to get this type of funding without a bankable study.”

Looking ahead, Smithson believes that Stellar, which is listed on London’s AIM, is well on its way to making the transition from being primarily an exploration company to a commercial mid-tier producer. “It is almost certain that Tongo will be developed at some point given its excellent potential and its very low capex and our hope is that we will start on development sooner rather than later – and, in a best case scenario, sometime this year,” he says. “The outlook for Baoulé is slightly less clear cut. Our current thinking is that it is a very viable project but clearly we need to get the full results of the trial mining exercise before we can say much more than this. Overall, we’re extremely happy with the progress made on both projects over the past couple of years and believe that Stellar is well placed with its assets to take advantage of a rough diamond market that has very sound fundamentals and a healthy longer term outlook.”

Photos courtesy of Stellar Diamonds

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