

Journal Comment

It's all been done

'We don't know a millionth of one percent about anything'

Thomas Edison

The papers in this issue are from the 5th bi-annual conference in the series *Diamonds—Source to Use*, which covered the full spectrum of the diamond pipeline from exploration through to sales and marketing.

Almost 150 years after the first discovery of diamonds in southern Africa, the region's diamond industry remains healthy and continues to surprise through its ability to reinvent itself and create new opportunities, at times from deposits regarded as having been less than interesting in the past.

It is therefore noteworthy that a number of the 'new' diamond mines that have come on stream in the region, or are currently under evaluation, during the last few years are not recent discoveries. De Beers' Voorspoed Mine, which is situated close to Kroonstad in the Free State, has been around for more than a hundred years but the application of modern treatment and recovery technology has breathed new life into this old lady. Similarly, Paul Loudon of Diamondcorp reports on his vision for the resurrection of the Lace Mine, which lies close by to Voorspoed and which was last mined in the 1920s. The AK6 deposit, now the Karowe Mine operated by Lucara Diamonds in Botswana, was also discovered more than 40 years ago but lay fallow until a new phase of more rigorous exploration and evaluation using new technologies laid bare its potential.

Undoubted factors to be considered in these successes are the significant advances made in the metallurgical processing techniques employed to release diamonds from their host rocks. Also, recognition of the importance of ensuring that diamonds are liberated in a 'friendly' way, in order to ensure that maximum value is obtained during the diamond winning process, has gained significant ground in the last 20 years. Examples of these are provided in the paper on the commissioning and operation of an autogenous mill at the new Karowe Mine and the application of bulk X-ray sorting as an alternative to dense media separation plants and sensor-based sorting as a more effective and efficient means of recovering diamonds.

Improvements in open pit mine planning processes at the Jwaneng Mine in Botswana and the Letseng Mine in Lesotho are presented in two papers. For the Jwaneng Mine, the richest diamond mine in the world, the crucial importance and value of geotechnical investigations in ensuring long-term mine viability, as applied to open pit slope stability studies in the project development phase, is well described. In Lesotho the application of modern software in optimization of the mine planning process ahead of exploitation is effectively demonstrated.

In considering the current diamond mining profile of South Africa it is perhaps worth dwelling for a moment on the fact that the Dutoitspan Mine in Kimberley is now more

than 140 years old and the Cullinan Mine north-east of Pretoria has been in operation for 110 years.

The technical and safety challenges of deep underground mining in these old kimberlite mines as well as the Finsch Mine are described in three papers and provide insights into how the application of non-traditional diamond mining techniques has the potential to unlock new value from these operations.

No diamond conference would be complete without some commentary on our imperfect understanding of how kimberlites found their way onto our southern African geological scene. Mike Skinner reminds us that the final story on kimberlite emplacement theory has still to be written and, indeed, may be a story that still has a long way to run, as new observations and theories enter the scientific domain.

So, where are the new deposits that will drive diamond mining in the 21st century and what of the future of diamond exploration? As explained in papers by Mike De Wit and John Bristow, as geological understanding of the complex relationship between diamonds and kimberlites and other mantle-derived minerals has improved, the large-scale systematic prospecting based on broad-scale regional stream and soil sampling – originally largely carried out in Africa by companies such as De Beers and African Selection Trust – has been supplemented with sophisticated mineral chemistry studies of mantle-derived minerals associated with diamonds and advanced modern airborne geophysical and other remote sensing techniques. The paper by the Petra Diamond team of Jim Davidson and others describes how future discoveries may come about in regions of young cover sequences such as the Central Kalahari Basin of Botswana, and Mike Lynn and Owen Garvie explain how new opportunities may arise through re-examination of previously known deposits in countries such as Lesotho.

There seems little doubt that future diamond explorers, searching for those new and extremely elusive world-class diamond deposits, will require deep pockets, strong will, and perseverance to cope with the challenges of 21st century diamond exploration.

There is undoubted opportunity for major new diamond discoveries. However, if we are to see any repeats of the enormous successes that were achieved in Botswana and South Africa in that amazing period from the 1960s to the 1980s, then host governments must also play their parts by providing encouraging and supportive environments for diamond exploration and the long-term and productive mining that will inevitably follow.

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