

Estimating diamond price for a kimberlite mineral resource: challenges, and potential changes to the CIM best practice guidelines

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The CIM "Best Practices Guidelines for rock Hosted Diamonds" was written in 2008. NI 43-101 was published in 2011 and the CIM "Definition Standards for Mineral Resources and Mineral Reserves" in 2014. The CIM revised and updated its "Estimation of Mineral Resources and Mineral Reserves Best Practice Guideline" in 2019 but the 2008 diamond guidelines were not included in this update.

It was felt by many explorers and investors that a review of the diamond guidelines was also required. New learnings since 2008 could be incorporated into the review along with alignment to other international codes of practice. Initially, the focus of the review would be on the estimation of average diamond price with the objective of:

- Reminding practitioners and investors of the difficulty of estimating an average dollar per carat for a diamond mine.
- Reinforcing the accountability of the QP in terms of reporting an average dollar per carat.
- Providing guidance to the QP in assessing and recommending parcels for determining an average dollar per carat.
- Assisting the QPs and investors in understanding levels of certainty in the average dollar per carat.
- Assisting the QPs in following the reporting principles of "Transparency, Materiality and Competence" in declaring a dollar per carat value.

As part of the presentation, the authors will show an example where a higher diamond price was found in production than was estimated during the sampling phase and a second case study, where a lower diamond price was experienced in production than was estimated during the sampling phase.

The recommended changes to the guidelines would include:

- A minimum parcel size for reporting a diamond price for a PEA after the initial exploration has taken place.
- The reporting by size class of carats, dollar value, gem (carats and dollars), near-gem (carats and dollars), and industrials (carats and dollars) in tables or charts for the PEA/PFS/FS stages of a Project.
- An assessment of "certainty" in the current estimate of diamond price for the PEA/PFS and FS stages of a project.

In addition, the updated guidelines will provide guidance and tools for the Qualified Person to assess the level of confidence in the "Order of Magnitude" study/PEA parcel price and/or recommend a parcel size for a defined level of confidence for a PFS or FS price estimate.

Addressing estimation of average diamond price is no trivial matter. Diamonds are different from many other minerals and metals. They exist in their host rocks as discrete particles in very low concentrations. One carat per tonne, a reasonable grade in a mining operation, is equivalent to 0.2 ppm. To make matters more complex, diamonds vary in size and each stone making up the diamond population has a different shape, clarity and color, imparting a unique dollar value to that stone. These characteristics make ore body evaluation and estimation of the diamond price a challenging process. In this presentation, we focus on the challenge of estimating average diamond price for a project facing an investment decision. We develop an approach to help the Qualified Person assess the certainty of an existing diamond parcel or the size of parcel required to reach a defined level of confidence. Some aspects of this challenge have not been shared in the public domain previously.

It became apparent after reviewing a number of diamond populations from producing mines, that a simple classification system based on the diamond size and quality of the early evaluation parcels could be developed to underpin advice on the parcel sizes required for FS level price estimates. At one end of the spectrum were kimberlites containing finer diamonds with a lower proportion of gem and at the other end were kimberlites containing coarser diamonds with a higher proportion of gem. These two groups of kimberlites differentiate themselves readily from each other and from a larger group of kimberlites containing “intermediate” size and quality distributions.

Our analysis suggests that parcels of approximately 1,000 carats will enable the Qualified Person to classify a kimberlite into one of nine “size versus quality” boxes, and so obtain practical guidance on the parcel size required to deliver a price estimate within a defined tolerance (say $\pm 15\%$), or to predict the likely level of confidence in a price estimate generated from a parcel of 5,000 carats.

The authors recognize that the nine "size versus quality" boxes oversimplifies the variability of diamonds in nature. For example, the proportion of gem quality diamonds can vary with diamond size, in other words it can increase or decrease linearly, or it can undulate with increasing size. The degree and rate of change can impact the estimation of the diamond parcel required for a given level of confidence. Research is on-going to better quantify the impact of this additional dimension on parcel size.

The results of our assessment do not discount the long-established recommendation of 3,000-5,000 carats for an FS price estimate; rather they emphasize that parcel sizes depend very much on the particular characteristics of the diamonds in a kimberlite. For example, to underpin investment decisions, parcels <3,000 carats should provide the desired level of confidence for finer diamonds with lower proportions of gem, but much larger parcels (>10,000 carats) will be required for kimberlites containing coarser diamonds with higher proportions of gem.

Another consideration is that no two kimberlites contain the same diamond population, hence ore bodies comprising more than one phase of kimberlite (or magma pulse) will

require follow-up sampling to generate diamond price estimates suitable for underpinning investment decisions.

It is hoped that the revised guidelines will create a better understanding of diamond price estimation in hard rock diamond deposits for explorers and investors alike and in doing so, will help re-invigorate junior company activity leading to the discovery and development of new, profitable diamond mines.