

Maximizing Resources and Reserves Conversion with Optimal Drilling Allocation

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ABSTRACT

Mineral exploration projects aim to convert the largest amount of mineral resources to a higher level of knowledge (Inferred to Measured and/or Indicated resources) during pre-feasibility stages. The main idea of this study is to reduce geological risk and increase reliability focusing the exploration budget to create value to the company. However, when not linked to a production plan, exploration drilling can become costly and ineffective. Therefore, a strategy should be performed to maximize ore resources conversion and minimize drilling capital costs. The study assesses the optimal infill drilling strategy that meets these criteria based mainly in three main aspects: reducing uncertainty, where to drill and when to drill. The methodology consists of carrying out a data spacing analysis and accessing uncertainty to define the ideal drill spacing which converts Inferred to Indicated resources. Firstly, classification is defined by data spacing supported by conditional simulation, considering the 90 % confidence level for a specific production period. The second question, where to drill, is defined on a probabilistic approach, by running a pit optimization for each realization. If a block falls inside any of the simulated ultimate pits, then this block will have probability to be converted to ore reserve. The third aspect, when to drill, is based on the same probabilistic approach, but accounting the pushback phases: if the block falls inside the 2nd phase in at least 70 % of the cases, then this area will have high priority against others. To demonstrate the methodology, a case study is presented in a gold deposit to be mined using open pit method in the pre-feasibility stage, in which ore continuity in depth is suggested but still sparsely drilled (inferred resources).