

Simple solutions for solving complex problems – combining MIK with OK estimation techniques at Olympic Dam

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ABSTRACT

An estimation technique dubbed “MIK-OK” was pioneered by the Olympic Dam Resource Geology team for Si estimates in late 2008, and has systematically been refined, tested, and validated as it has been rolled out to other estimates from 2009 onward. The MIK-OK methodology uses two well established estimation techniques, namely Multiple Indicator Kriging (MIK) followed by Ordinary Kriging (OK). The main theory of the technique is that in disseminated mineralisation not hosted in discrete lithological units/domains, the MIK estimate can serve as an underlying grade change model to underpin the OK estimate.

The MIK component is used to discretise various grade distribution into 20 discrete domains (bins) using 19 strategic cut-offs. Volumes defined by the MIK estimate are used to derive local domains, which in turn allow control to be established over sample sharing arrangements during the OK estimation. The OK parameters are empirically setup such that only samples from adjacent/neighbouring MIK-derived domains can be used for the final estimated grade. This automates the sample sharing arrangement across domain boundaries, thereby avoiding the common pitfall of using samples unrelated to one another during the final estimate, and negating the requirement to define specific, and more often than not subjective, grade contact relationships.

Over the course of a decade of resource model updates it has been proven that the MIK-OK technique better replicates the grade observed in drillhole samples, honours the grade changes observed from one drillhole sample to the next, and avoids the over-smoothing inherent in classic estimation approaches. The technique is particularly powerful at the local scale as it simplifies the estimation implementation by not requiring the several hundred physical boundaries (wireframes) necessary to account for all the possible grade contact relationships (e.g. hard, soft, semi-soft etc.) observed in the >565,000 drillhole 5m composites available from Olympic Dam.