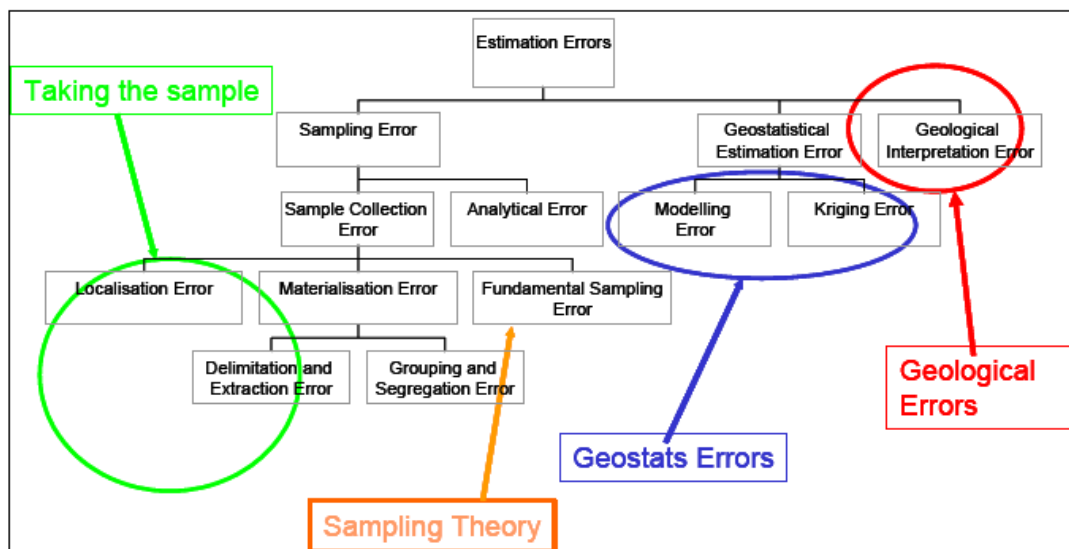


Sources of Errors in Mineral Resource Estimation

By Godknows Njowa

The mineral resource evaluation and estimation process is not an exact science; and it depends on the knowledge and experience of the Competent Person and his ability to apply his mind, make reasonable assumptions, interpretations and exercise sound judgment.

The mineral resource and mineral reserves estimate are themselves dependent on the underlying sample data and the processes used to generate the respective estimates. All these measurements have some degree of associated error or confidence level. The classification of errors associated with a mineral resource estimation process are summarised in the Figure below.



Sources of Mineral Resource Estimation Errors (after Noppe, M, 2004)

There are five principal geological reasons for incorrect mineral resource estimates:-

- poor sample and assay quality data;
- a lack of detailed mine geology and fundamental understanding of the deposit;
- poor interpretation of grade distribution characteristics;
- poor understanding and application of computer-assisted estimation techniques; and
- the failure to recognise the effect of selectivity and the change of support or volume-variance effect, namely, that mining needs to be controlled on the grades of large tonnage blocks and not small-volume samples.

A mineral resource and mineral reserve statement generally contains a single set of grade and tonnage results without further disclosure of the potential inherent errors and risks associated with these estimates. Some scenario and risk analyses are conducted, but confidence levels and limits are rarely quoted and, if they are, often do not take into account many of the factors that cause uncertainty in the grade and tonnage estimates. Mineral Resource and Ore Reserve estimates thus carry certain errors leading to uncertainty and risk; some of these are unquantifiable for various reasons, which the industry stakeholders should question continuously.

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