RESOURCE RISK CHARACTERISATION

Figure 1 is about quantifying the relationship between precision of a resource estimate, drill spacing and scale of production.

It is very effective in communicating a key aspect of the resource risk to managers and decision-makers.

How do we establish it? A sound combination of geological knowledge, geostatistical variances and conditional simulation can assist with a solution. At operations, sensible figures can be produced from the analysis of production and grade-control data.

A paper by H Sans and JR Blaise (1987) discusses how geostatistical modelling and the analysis of the grade-control data from a trial pit were used to advance the development of the diagram in Figure 1 for a complex uranium resource. See also H Sans et al (2002) for an application to a phosphate deposit.

This diagram provides insight into the linkages between drill spacing, resource risk and mine planning. It can be used to:

1. Develop a staged drilling strategy that manages the resource risk out, or mitigates it. Figure 1 shows that tightening the drill spacing has a greater impact on the precision of the tonnages associated with short production timeframes (e.g. a half-year period, a quarter) than on the precision of the 10-year tonnage.

2. Link resource classification to scale of production: a resource may be classified globally in the Measured category while individual blocks may qualify for Inferred status only!

3. Understand the relationship between cut-off grade, mine planning and resource-reserve classification. The hypothetical case in Figure 2 serves only as an example.

4. Assess the level of drilling required to meet business requirements.

Random block estimation-error pluses and minuses cancel out when blocks are aggregated over larger mining units and production periods (Figure 1). Consequently, drilling focussed on improving precision may deliver little economic benefit if the additional data have limited impact on the decision-making process and operations.

Characterising the resource risk as suggested in Figure 1 can benefit the feasibility study of resource projects. At operations, this approach can enhance strategic planning and the optimisation of the orebody.