RECONCILIATIONS ALONG THE MINING VALUE CHAIN

The diagram below pictures four key grade-tonnage reconciliation (R) steps across the value chain.

1. **Mine reconciliation**

Comparing resource and grade control data is good practice to check on the validity of the geological model and the suitability of the estimation methodology and drill spacing...and no mill input is needed.

Further comparison of the resource-reserve estimate to the mine output should involve a diverse range of factors including loss and dilution, mining to plan, drill-blast-load-haul practices, stockpile management, availability of machinery and cycle time to cite a few.

Experience shows that poor operational performance can contribute significantly to a grade-tonnage gap. This includes the daily interactions between Geology and Mining where ineffective. Routine collection of process variation data during mining can be pivotal in identifying the root-cause of the gap.

2. **Mill reconciliation**

The Amira-P754 project has issued guidelines that address the large variance in metal accounting practices seen across the industry. Implementing the Code of Practice, one of the project deliverables, and the recommended sampling and measurement strategies, data processing methodologies and reporting practices should greatly improve mill reconciliation transparency, auditability...and credibility!

Our view however is that both metal accounting and mass balancing could benefit from characterising more effectively variability patterns in the mill, an area that is hardly touched upon at present.

3. **Mine-to-Mill reconciliation**

Common reconciliation practice is to compare the mine output to the mill feed on a monthly basis. If no cross-functional mechanism is in place to review how Geology, Mining and Processing have performed, any grade-tonnage gap can easily be put down to something wrong in the grade control model!

For mine-to-mill reconciliation to deliver the greatest value, the geologist, mining engineer and metallurgist should work together and the outcome be "owned" by the team.

4. **Resource / Reserve-to-Product reconciliation**

Over the years, this reconciliation measures how close the actual saleable product quantities are to the feasibility study predictions. When performed properly, it may deliver technical or economic knowledge of a strategic nature on the evaluation process and project execution. Or enable Management to make strategic business decisions earlier e.g. mine expansion, asset divestment, or product diversification.

Further to measuring actual performance along the value chain, reconciliation can critically influence the design of strategies aimed at improving operational performance and maximising long-term value.