GeoMetallurgy Development

Geometallurgy Development Phases

Developing a geometallurgical model is an iterative process. Each phase informs and builds upon the previous one, leading to a more refined model.

- Geometallurgical Experimental & Analytical Goals
- Ore Body Analysis of Existing Knowledge
- Create foundation geometallurgical matrix based on existing knowledge
- Geometallurgical Orientation Study
- Orientation Study Test Work Planning
- Update Geometallurgical Data Matrix
- Multivariate Analysis of gemetallurgical data matrix
- Class Definition
- Process Modelling (class by class)
- Hypothesis Validation Study
- Mapping Study - domaining of process behaviour
- Evaluate Results
- **Geometallurgical Study Conclusion**

Geometallurgical Sampling & Characterisation Requirements

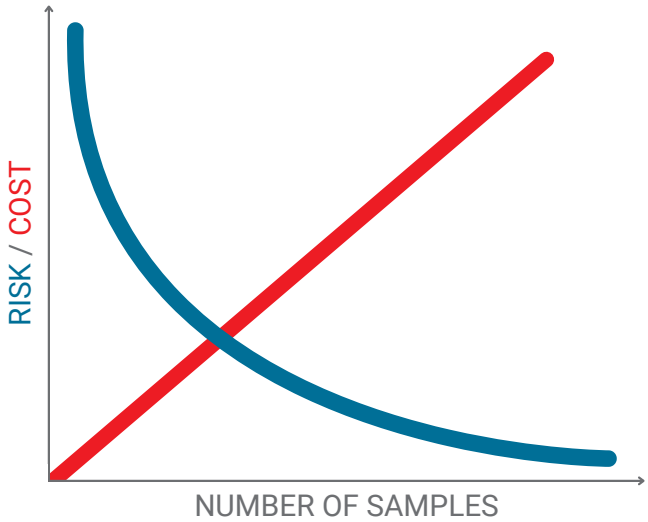
Geometallurgical variables include any property that could have an influence on the economic viability of the study.

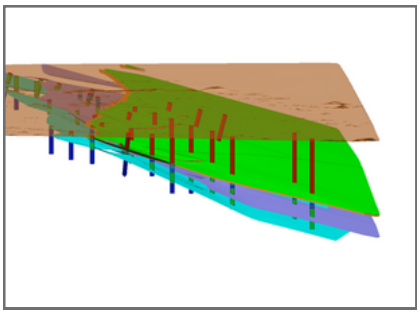
Every ore body is unique, and therefore representative sampling and testing is necessary to understand the impact of fresh vs weathered ore, mineralogy and ore domains on the efficiency of the processing plant.

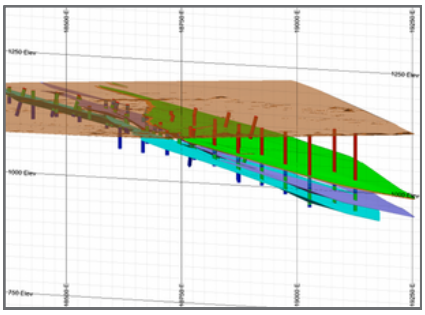
Representative sampling is critical and should consider the following:

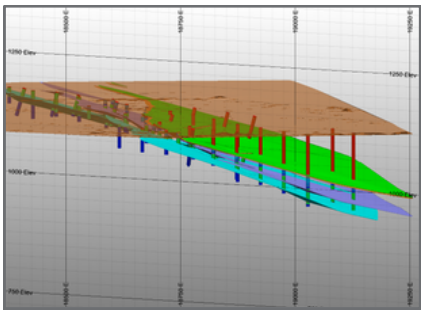
- Drillcore samples vs RC chip samples
- Selection of samples should represent entire orebody
- Impact of dilution
- Known ore domains

The number of samples is a function of cost vs risk and is often limited by drill core availability, budget and time. The integrity of the samples needs to be maintained throughout the sampling process to limit the occurrence of sampling errors. Diamond drill core samples are typically used for characterisation analysis with their location recorded for modelling purposes.









Geometallurgical Variables

"Geometallurgical variables include any rock or mineral property that has economic implications on the mining business model," (Dominy, et al., 2018).

GEOMETALLURGICAL VARIABLES

PRIMARY VARIABLES
Any intrinsic rock property that can be directly measured

- Metal Grade
- Geochemistry
- Rock density
- Grain size
- Redox zones
- Ore classification
- Spatial distribution of deleterious materials
- Geotechnical variables

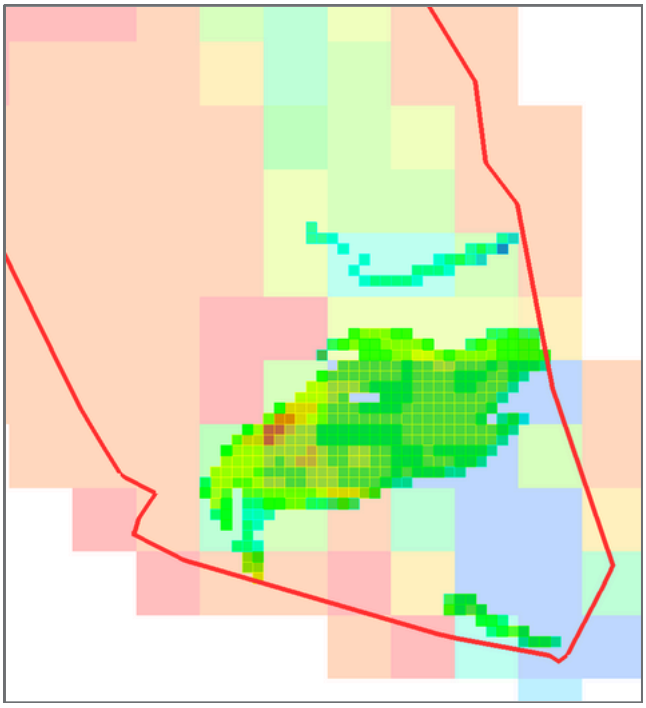
RESPONSIVE VARIABLES
Attributes that describe the rock's response to various processes

- Ore Recovery
- Power consumption
- Grindability
- Throughput
- Particle Density

Mine Planning and Geospatial Modelling

Geospatial geometallurgical blockmodels are integrated with the Mineral Resource blockmodel to form a unified mining Mineral Reserve blockmodel which can be used for predictive mine planning and production reconciliation purposes in terms of plant recoveries and metal/product accounting.

Geometallurgically geared predictive mine planning can be used to support pro-active blending strategies to ensure optimal plant recoveries, or in instance of poor recoveries or reconciliation, assist in understanding where things might have gone wrong in terms of ore sourcing or even to identify areas of non-adherence to the mine plan might have occurred.



Our Value Proposition

VBKOM is a provider of innovative business and technical consulting services and solutions for the mining and capital-intensive industries. We challenge ourselves to apply fresh thinking and to utilise our experience and technology in pioneering new ways to deliver forward-thinking solutions.

The VBKOM team is highly capable and experienced in offering geometallurgical services. We aim to provide quantitative predictions of the variability of the ore, concentrate and tailings to ensure better utilisation of the resource. Due to VBKOM's diverse pool of expertise, we can offer our clients specialised skills within a one-stop-shop culture. Our multidisciplinary capabilities make us an ideal partner to the mining, petrochemical, agricultural, and construction industries.

Our focus on long-term client relationships combined with our technical skills ensures that our clients can fully optimise their value chain.

At VBKOM the quality of our work is guided by a simple philosophy – our success is driven only by the success of our clients and the achievement of our professionals. By using cutting-edge technology and the most advanced computer modelling systems on the market our technical expertise comes unrivalled. Our capacity and continuity have earned us the trust of some of the world's most prestigious mineral resource companies. By staying true to our core values; by utilizing our vast project-specific experience and qualifications; along with applying proven world-class methodologies and processes the VBKOM team is a dynamic, flexible and innovative team with a track record standing as solid proof of our competitive edge in our field.

VBKOM has been successful in providing solutions of an independent nature to a range of clients in the mining industry. Our consultants have developed a good understanding of the needs and opportunities of both open pit and underground studies and operations. We look forward to adding value to your company. We believe that independent consultants can provide optimal solutions to the Client without any risk of providing a solution with an inherent conflict of interest. The VBKOM strategy is to form part of the owner's team to define and protect the owner's interest within our area of influence and control. VBKOM is committed to adding value to each client through innovative, practical, and trustworthy engineering solutions.

References

Aasly, K. & Ellefmo, S., 2014. Geometallurgy applied to industrial minerals operations. *Mineralproduksjon*, Volume 5, pp. A21-A34.

Dominy, S. C., O'Connor, L., Glass, H. J. & Xie, Y., 2018. Geometallurgical Study of a Gravity Recoverable Gold Orebody. *Minerals*, 8(186).

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