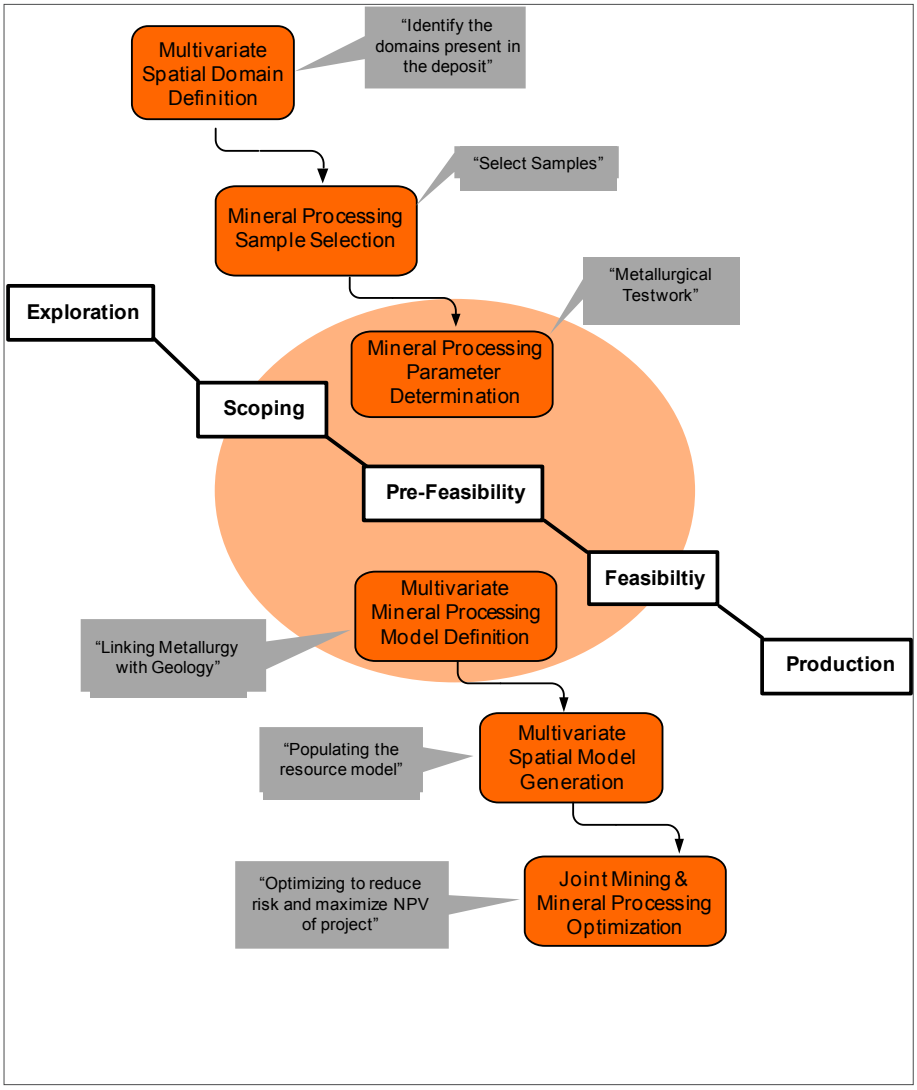
GEOMETALLURGY

WHAT IS GEOMETALLURGY?

Geometallurgy is:

- the geologically informed selection of a number of test samples to determine metallurgical parameters
- the distribution of these parameters through an orebody using an accepted geostatistical technique to support metallurgical process modelling.

The distribution can be influenced by the geology of the orebody, in that the lithology can affect some of the parameters.The integration of these geometallurgical stages into the traditional testwork approach is shown below in Figure 1.



APPLICATION OF GEOMETALLURGY

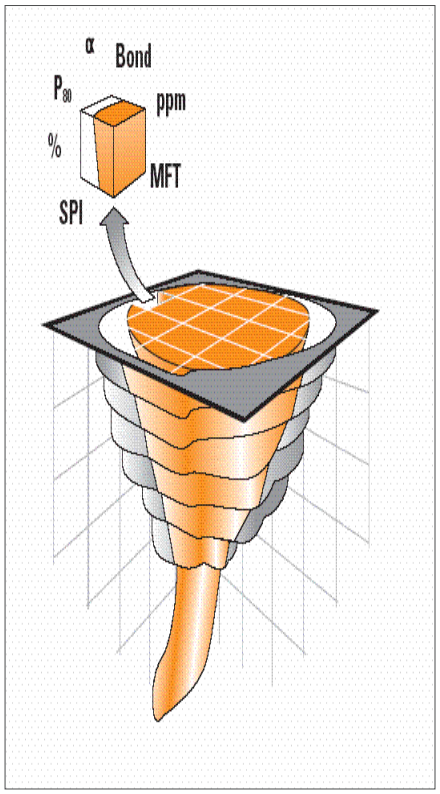
Geometallurgy compliments, but does not replace, the traditional metallurgical approach during the development and operation of a mine. Geometallurgical information can be used to:

- Inform flowsheet design
- Size equipment
- Assist in plant design
- Optimize mine-to-plant performance
- Forecast production
- Reduce risk during feasibility, production and operation.

WHAT PROJECTS BENEFIT MOST FROM A GEOMETALLURGICAL APPROACH?

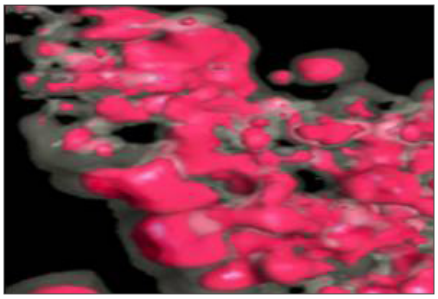
Geometallurgy is a cost-effective technique used to characterize ore variability during any stage of exploration, development or operation. It is well suited to:

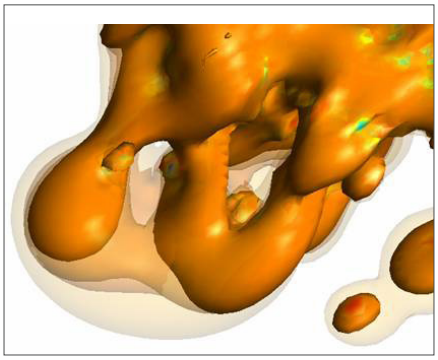
- Highly variable or strongly zoned deposits
- Several close deposits that will be milled together
- Remote or deep deposits that are readily drilled but not easily bulk sampled
- Projects requiring complex or new metallurgical approaches
- Brownfields or sight-of-mine exploration and expansion projects that exploit new, deeper or adjacent reserves
- Projects with significant legacy drill core that are being reevaluated due to new economic circumstances



REQUIREMENTS FOR A GEOMETALLURGICAL PROGRAM

- Technical Publications – Digital copies of existing technical reports and published papers regarding the geological, geotechnical, geophysical, geochemical, tectonic, mineralogical and textural information.
- Drillhole Database – Digital copy of the existing drillhole database containing collar, survey, geological, geotechnical, geophysical and geochemical information along with any other relevant data.
- Plans, Cross Sections and Perspectives – Digital Copies of any existing plans, cross sections and perspectives including geological, geotechnical, geophysical, geochemical, tectonic, mineralogical and textural information in addition to any other relevant data.
- Spatial Interpretations & Models– Digital copies of the existing spatial interpretations (strings) and models (wireframes and/or blocks) including geological and structural information.





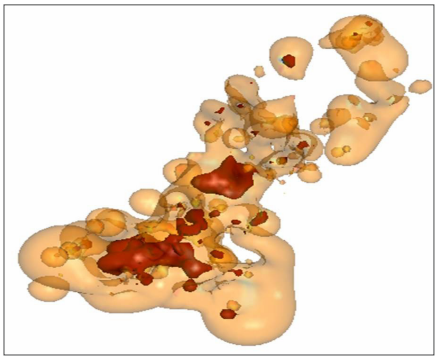
KEY TECHNICAL DELIVERABLES

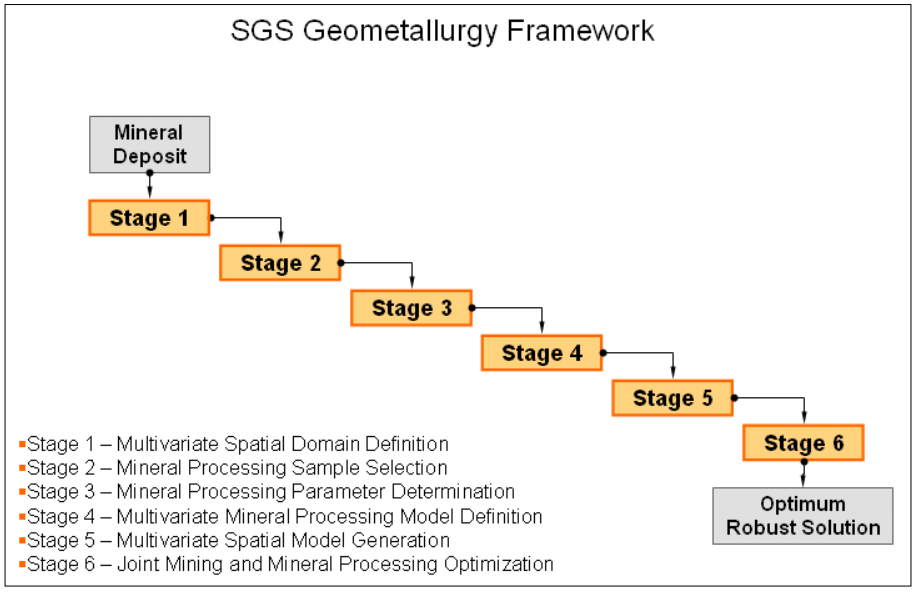
The key technical deliverables are:

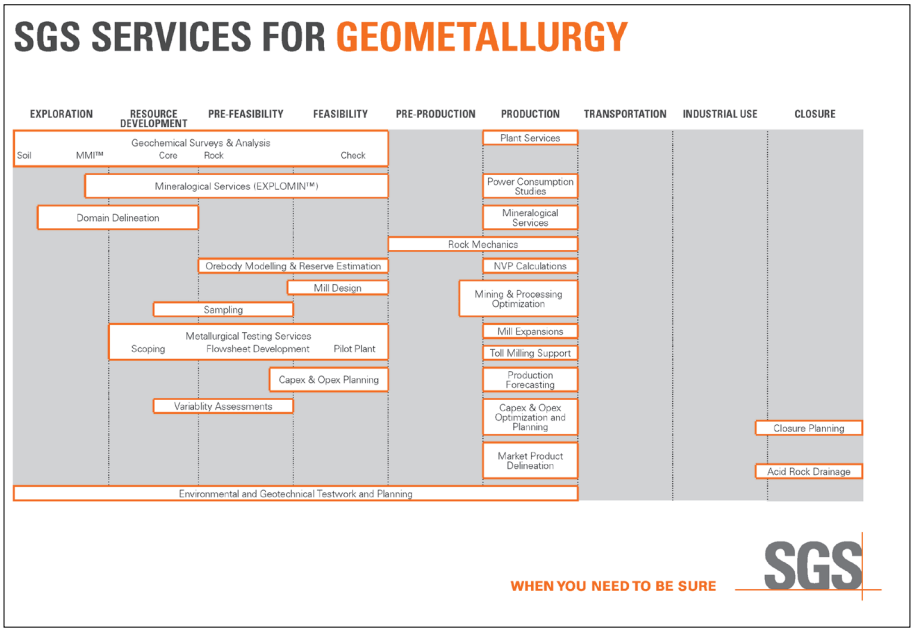
- Understanding of the linkages between geology, mineralogy and metallurgical performance.
- Robust flowsheet that will effectively process ore over life-of-mine.
- Optimized sizing of plant equipment given ore constraints, operational costs and physical constraints.
- Capability of predicting and modeling plant performance within known statistical parameters. Can generate average expected recoveries, grade, throughput, P80 and concentrate grade values on a block-by-block or year-by-year basis.
- Ability to forecast and reconcile production on a monthly/quarterly basis at existing operations.
- Capacity to interface plant performance results with mine planning to refine cutoff grade and optimize mine-mill production.

EXPERTISE

SGS is the market leader in using geometallurgy. For 10 years we have been actively developing and applying this approach to project development. We typically run 12-15 programs a year for projects at any stage of development or large and small companies throughout the world and share our intellectual expertise in this field with many global companies.







CONTACT INFORMATION

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