

Mill Ops 2024 Abstract

Practical Geometallurgy – And Let There Be Light

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Mining and processing operations that do not understand the characteristics of their deposits survive as did J.R.R. Tolkien's Gollum; in the dark until a metallurgical crisis drags them out to search for a precious solution. Geometallurgy is about knowing metallurgical and production outcomes before ore is mined and processed and requires that the key drivers of these outcomes are attributes in the mine block model. Practical geometallurgy is the use of deposit geological "style" characteristics and the common drivers of performance for that deposit style to generate these attributes. This allows the common features of the deposit with others of the same style with operating history to be "banked" while focussing attention on differences discovered during a geometallurgical program. Mineralogy controls metallurgy, so a practical geometallurgy program is about measuring the important characteristics of the basis lithology, alteration, and weathering units in the deposit such as mineralogy, mineral associations, mineral liberation, and mineral texture before embarking on extensive and expensive metallurgical test programs. This paper describes the general outline of a practical geometallurgy program from sampling and retaining the characteristics of ore in 3D mineralised space to typical analysis and test programs and using the results of these programs to develop geometallurgical models to populate the block model. Geometallurgy case studies for some common deposit styles are included to give examples of the consistent drivers of performance inherent in each style.