Impact of Integrated Mine-Plant-Waste-Tailings Sequencing on Long-Term Planning

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The current situation of the global mining economy is increasingly focused on the utilization of materials previously discarded in the mining process. The waste from the past, through new processing routes, is gaining new contours for use as high-value-added products.

The strategic mine planning process has consequently had to adapt to the new economic reality. In standard scenarios, the focus was primarily on mine sequencing aimed at the highest economic return, with all infrastructure allocated as a necessity of mining.

This work aims, in strategic planning, to configure and select the best composition of mining structures. The entire Mine-Plant-Waste-Tailings-Products chain will be considered as a factor in the sequencing of a multi-mine complex, in order to achieve the most sustainable utilization of the current mines' waste.

The sequencing is based on concurrent flows of process configurations and capacities, structure sharing, and flexibility of feed types. These factors will guide the sequencing, which will be constrained by components such as waste and tailings disposal rates, lithology feed relationships, and especially product composition through market specifications, all while respecting product shipping capacities.