

## **THE RUN OF MINE GRADE IS ON TARGET BUT THE PROCESS PLANT IS UNDERPERFORMING – WHAT'S THE PROBLEM?**

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The process plant has been designed based on a set of samples that allowed for a design envelope for the proposed mine feed. The operations start up and the mine supplies material on specification by chemistry which is homogenised on a series of blending stockpiles. The process plant is producing final product on specification for chemistry but the through put is variable and not to name plate capacity.

The operations team points fingers at the mining team who point fingers back at operations and so this vicious circle goes on. A technical investigation in the beneficiation plant observes that the feed varies between competent ore and hard ore to grind ore. The investigation also notes that although the feed is chemically correct, the physical and mechanical characteristics of the ore varies from the typical ore that complies with the design basis samples. The harder ore causes issues in the comminution section in crushing and downstream grinding area with respect to throughput or lack of it.

With this insight it is now worth trying to understand how the mining (and geology) teams can work with the process team to coordinate operations during the times when abnormal material is mined. The solution to achieving optimal throughput in the process plant is to develop a working system between the mining and operations teams. Key to this is cross-training and regularly interfacing between mine geologists and plant metallurgists as opposed to compartmentalizing these functions. Geologists and mine planners should understand the downstream beneficiation process and metallurgists should understand ore variances in the field as well as ore blending during the mining, crushing, stockpiling and reclaiming stages. Next, a review of the blending effort may need to be modified starting with the number and location of mine faces being exploited at any one time.

It is not good practice to design a beneficiation plant on a series of bench tests or a single pilot plant test sample. Instead, multiple bench scale tests are conducted to determine the viability of the processing scheme on different ore types expected to be encountered in the commercial operation. Pilot plant tests are then conducted to confirm the process and the test results are used to generate data that is used to design the commercial plant. Pilot plant tests can also be utilized to verify the metallurgical performance of the process on different ore types.

This is a question that should be assessed in the mine development phase. The answer is to test a range of ore samples to cover as best possible the expected ore characteristics that the process plant could experience in its operating life.

As part of operational activities, it is prudent to develop a program to process ore samples taken from the core drilling or exposed future progressive mine face samples. Again, to better understand ore variance in the process design. It should be remembered that the type of drilling method can influence the particle size distribution of the material. This can impact the subsequent process test work.