Improving Fragmentation and Ore Displacement Control at Homestake McLaughlin Mine Lower Lake, California

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ABSTRACT

The McLaughlin Mine is an open-pit disseminated gold mining operation. Homestake Mining Company's approach to solving some of the blasting problems inherent to this type of deposit provide an interesting case history. Geology, although unique and site specific, is overall similar to other mines within the Western United States over-thrust belt and demonstrates an excellent example of the blasting conditions and requirements common to most of these operations.

Typically, each blast bore hole is assayed, surveyed and flagged. Furthermore from an ore control stand point, not only the bore hole assay is taken, but each drill hole sample is tested for sulphur and carbon content. Both sulfur and carbon play an important part in McLaughlin's milling process as sulphur provides the fuel for the autoclave milling and over abundance of carbon slows down the ore oxidation process. Often ore zones of varying grades are irregular and scattered throughout the pattern (see Figure 1). Due to the designed production volume of upwards of 40 - 60 thousand tons per day, fragmentation is very important. This fact must be balanced by the necessity to assure that displacement is kept to a minimum as ore dilution can be a major problem if not kept in check.

Obviously, this responsibility rests on the blast design and ore control engineers, as well as the drilling and blasting crew. Strict adherence to drill pattern and shot loading design is essential to accomplish the desired results. Blasters at most mines of this type face the same blaster's worst nightmare "break it real well - but don't move it."

The drill and blast program at the McLaughlin Mine has undergone a natural evolution in order to establish and then fine tune a system capable of consistently accomplishing the stated goals.

This progression has involved most of the major blast design parameters, but has

specifically centered around drill pattern, delay sequence and shot orientation relative to the geology. A methodical, systematic approach has avoided changing too many things at once and has resulted in a steady, scientific "fine tuning" process and provided solutions to a tough blasting situation.