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High-Pressure Slurry Ablation (HPSA) – A New Liberation Technology

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ABSTRACT

Of the total energy consumed by the mining industry, more than 50% is spent on ore comminution. Disa has demonstrated in various testing campaigns that it provides significant energy savings with its High-Pressure Slurry Ablation (HPSA) technology. HPSA is a new particle attrition technology that works on the principle of particle-to-particle collisions between two or more high-pressure slurry jets. Particle disassociation is realized through the intense collisions created by high-pressure pumps moving slurry through a series of nozzles within the collision chamber. Preliminary testing using both lab and pilot-scale HPSA units has demonstrated promise to effectively be applied to a diverse group of materials, specifically soft to medium hard ores. Materials include uranium, vanadium, rare earth elements, potash, iron, molybdenum, copper, gold, phosphate, graphite, and others.

A rare earth element mining company provided samples from its current operation to test the expected benefits of HPSA. After minutes of processing the ore in HPSA, a particle size shift was observed. Furthermore, HPSA was able to concentrate over 95% of the total rare earth elements (TREEs) in the fine fraction (-37 micron). These results from processing in a single HPSA unit show a substantial increase over the current operation's multistage regrind.

HPSA is also uniquely suited to uranium bearing material due to its unique ability to liberate material along its intergranular boundary lines. During particle-to-particle collisions in the HPSA chamber, natural uranium bearing minerals such as carnotite which exhibit quartz association are selectively fractured and liberated from the quartz grains allowing the natural uranium and other constituents of concern to be separated by size, typically performed by screening at 53 micron. HPSA has repeatedly demonstrated that it can concentrate greater than 90% of the uranium in less than 30% of the processed mass.

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