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Ore-Max Technology Maximizes Heap Leaching Recoveries

It is interesting that only a handful of scientific and technological discoveries have had the greatest impact on the history of mining. Some of these are the discovery of dynamite, development of water pumps, and the chemical revolution of the late 1800s. Without them, modern mining would be impossible.

One modern innovation that has had just as great an impact is heap leaching, which revitalized the American gold mining industry. Without it, the gold boom in the Western US in the 1980s would have been impossible because previous gold recovery methods couldn't profitably extract the gold left in the US.

However, as with most technologies, how it is applied determines how successful it is. The difference between merely making a profit and maximizing mine life can rest on something as simple as the emitters that spray the leaching solution over the heap.

As several mining companies in North and South America are discovering, emitters can make a dramatic difference in metal recovery rates. These emitters, which help keep the tubing that is used in heap leaching from clogging with mineral deposits are often thought of as cheap pieces of plastic, however, they are actually a critical stage in the recovery process.

Although an emitter costs a few cents each, it can produce over \$50 in copper every year. According to Ore Max if improved emitters increased extraction by 10%, a mine producing 135,000 tons of copper a year would increase revenue by over \$20 million.

Unfortunately, most heap leaching companies

regularly experience a 10 to 25% loss in efficiency because of plugged emitters. Either too much or too little solution coming out of the tubes will lower recovery rates of the ore. And, up to now, there hasn't been any satisfactory solution but to replace the tubing when it plugs.

The solution, according to Ore Max was to produce emitters that were less prone to plugging, which would improve flow throughout the leaching system and reduce the down time required when replacing tubing. That led to the development of the Max-Emitter, which dramatically reduces plugging. According to Brandon Beard of Ore Max the design of this emitter makes it much less likely to plug up.

While most emitters have a few holes or a small screen to allow the solution to pass through, Max-Emitter has a screen area 10 to 20 times longer than the competition, which makes it dramatically harder to clog.

Another design difference is that the screen covers 330 degrees of the tubing, which prevents clogging as the tubing twists on the leaching pad. Other emitters can plug up easily when the tubing twists, which makes it easier for particles or crystals to block the small number of holes. By creating an emitter with screening 330 degrees around, Ore Max engineers solved a couple of problems that plagued conventional emitters. It reduced the velocity of the solution, which made it harder for a particle to enter the emitter and stick in part of the screen. It also insured that part of the screen would remain on top (where it is harder to plug), even if the tube twisted. In addition, the emitter has two outlet (discharge) holes to reduce the chances of

plugging.

The production improvements have been seen in a wide spectrum of leaching operations in different climates, altitudes, and mining conditions. In Arizona, it increased copper extraction by 25%. According to Julian Bolanos, Ore Max's South American Manager, emitters and special low flow sprinklers gave Chilean miners a 73% - 74% copper recovery rate even though mine engineers had predicted a 70% recovery as the best that could be expected under optimal conditions.

The emitter has also proved itself in domestic gold operations. In Nevada, the previous 1-gph emitters couldn't even finish the 60 day leach cycle and had to be replaced after only 30 days. They now use the 0.5-gph Max-Emitter, which completes 150-day leach cycle with no appreciable plugging.

The advantage of a more effective emitter doesn't stop there. By being more efficient, the mine is able to get better yields on lower grade ore that can extend the life of the mine and boost the eventual return on investment for that operation. It also makes marginal ore deposits nearby or previously worked heaps of ore profitable, which means the capital investment in mine infrastructure, can be amortized over a much larger amount of production.

While emitters may seem insignificant, the fact is that it is this simple device that makes an important mining technology work. It is a simple way to improve efficiency, increase mine life, improve the bottom line, and make the operation more recession proof all at the same time.