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Drip Emitter Technology Revolutionizing Heap Leaching Operations

by Kim Lamb

New drip emitter technology is changing the face of heap leach mining operations by maximizing metal extraction from the heap.

All heap leach operations begin with samples leached in column tests. Many heap leach projects were designed around column test results indicating ultimate copper or gold extractions from the heap of 85 percent. But how many of these projects have been funded, spending millions – sometimes hundreds of millions of dollars, to discover that actual operating results are 55 to 60 percent extraction? These results do not provide a good R.O.I. for the investors or shareholders and when the general managers ask questions, they hear excuses like "the ore is different from the column leach tests".

Generally, the reason the leach results are not as expected is because of poor solution distribution over the heap. The leach solution delivered by sprinklers tends to channel through the heap which leaves dry pockets in the ore with low to no metal extracted. The use of drip emitters to deliver leach solution to the heap improved the metal extraction but the results still did not match the column tests. The problem was still related to uneven solution distribution caused by emitter plugging – agricultural emitters used in the mining industry were not designed to operate with mine leach solutions. Agricultural emitters were often chosen because they were the "low-cost" alternative, but not many mine operators know their limitations.

With zero discharge regulations at the mine and the recycling of leach solutions – these solutions become extremely dirty and agricultural emitters were designed to operate with clean solutions – actually filtered to 150-mesh. The volume of leach solution pumped makes filtration difficult and sometimes technically impossible, not to mention, extremely expensive. Oremax has solved this problem for the mining industry by introducing new drip emitter technology called the Max-Emitter that is designed specifically for the mining industry, designed to operate through a complete leach cycle with almost any leach solution.

The Max-Emitter's new technology offers many advantages over other emitters including maximum plug resistance, maximum screen area and maximum flow control. Designed with a 330-degree screened inlet that is 10 to 20 times the surface area of any other emitter – the Max-Emitter is very difficult to plug. It also has the largest flowpath in terms of length and volume of any emitter available. The longer flowpath improves flow consistency from each emitter even with pressure variations. All these items together add up to improved solution distribution over the heap and improved metal extraction.

The Max-Emitter's technological improvements have been independently proven through extensive testing at the Center for Irrigation Technology (CIT) at Fresno State University in Fresno, California. The Max-Emitter outperformed any emitter ever tested at CIT by going through two complete series of grit testing without plugging and without any change in flow through the emitter. No other emitter ever tested has successfully completed even one series of grit testing without plugging.

A heap leach operation cannot extract the metal if the leach solution does not properly contact the ore. Putting the right amount of leach solution at the right place on the heap at the right time is what the Max-Emitter was designed to do. Additional technology – Oremax pressure regulators used on each emitterline on the heap, are critical to ac-hieving consistency from every emitter, insuring that they are operating at the design pressure and thus the correct design flow 100% of the time.

Oremax's new technology has proven itself to increase metal extraction while reducing operating expenses. An example of its success includes one large gold mine in Peru. After a conversion to the Max-Emitter, the mine experienced heap leach extractions in the 85% range; a 25% improvement over using agricultural emitters. Another large operation in Chile experienced a 13% increase in copper production from the heap and their tankhouse began operating at 100% capacity for the first time in years. These are just a sampling of successful findings resulting from the Oremax's new revolutionary systems technology.

With cutting-edge technology like the Max-Emitter, arguments surrounding the low-cost alternatives such as the traditionally used agricultural emitters, have become increasingly less persuasive or defensible. Mine operations can't afford to sacrifice any amount of metal recovery, the cost of lost profits is just too steep. A Peruvian mine with a typical 100-m x 100-m heap leach cell, had emitterline costs totaling approximately $2,000. But the gold in that one cell was valued at over $3,000,000. Each one percent increase in gold extraction was equivalent to $30,000. These are results that no investor or shareholder can afford to ignore.