Smart engineering **beats slimes costs**

In Africa, slimes dam liners are often improperly specified or non-existent. As environmental enforcement becomes more stringent, the need for drainage and liner management has increased. But, methods can be costly or take up too much land; **FRANCES RINGWOOD** investigates a solution.

Morné Wyk, I-Cat technical manager

LOCAL environmental management company I-Cat Environmental Solutions has come up with a cost-effective way to dry out slimes dams, so geosynthetic liners can be installed or replaced, without having to pay for expensive electromechanical filtration or find land for solar ponds.

"This year, we've launched our own proprietary technology, the I-Vap series of water atomisation evaporators. These come in three standard sizes, the I-Vap 250, the I-Vap 500, and the I-Vap 1 000. The number after the series name stands for the amount of cubic litres of water that each unit can treat per day," explains Morné Wyk, I-Cat technical manager.

"The evaporation rate of the process is 14 times more effective than solar ponds," he adds.

Case study

Prior to designing its own evaporators, I-Cat imported foreign units and found that the basic principles could be re-engineered to better serve South African market conditions.

"We launched our first I-Vap 500 earlier this year, at a gold mine on the East Rand. Water at the site was found to be highly acidic and the client wanted a way to achieve greater environmental sustainability. That unit has exhibited excellent performance for several months, as a result of a number of technical innovations," explains Wyk.

Built for Africa

"One of I-Vap's significant design features is its bellmouth inlet and outlet cone being made from carbon composite materials, eliminating product fatigue and damage caused by aggressive effluent. Using composite materials is particularly important, as other evaporation units available on the market are manufactured using galvanised steel, which deteriorates rapidly in acidic fluid applications," says Wyk.

In addition, the unit is lightweight and wheel mounted, so it can be moved from one site to another. I-Vaps can also be linked to a mini weather station, via a programmable logic controller, so as to react to heat, humidity, and wind. This enables the unit to automatically switch off when it rains, saving electricity. Also, when wind speeds are high, the fan housing automatically oscillates its spray away from set locations, preventing contamination of settlement areas and sensitive environments.

Perhaps the most impressive design feature is the I-Vap's dual-nose cone. Air is forced through the outer barrel, so water droplets propelled from the cannon are wrapped in an envelope of moving air. This means droplet dispersion retains the distance of similar products (up to 110 m) using about half the electricity. The unit can also be combined with a variable speed drive, which further reduces the I-Vap's energy consumption.

In addition, once an evaporation project has been completed, the unit can be repurposed for dust suppression.

With all of these unique features, the question is not whether mine and environmental managers can afford to evaporate their slimes but, rather, whether they can afford not to? 35