



## Water in Mineral Processing

Water is widely used for the extraction and on-site processing of naturally occurring minerals including ores, coal, petroleum, and natural gas. Where fresh water is limiting, or where large volumes are needed, companies may resort to recycling water. Any mineral-laden water will generally cause scaling on pipes, fittings, and machinery that it contacts, and this scale can pose a significant cost to business. Mineral scale is deposited naturally in many and varied compositions, while dissolving of scale is usually done by addition of chemicals.

In a wider sense, the diversity of agents used to process minerals includes: flocculants, and clarifiers, antiscalants/dispersants, promoters, crystal growth modifiers, defoamers/antifoams, filter aids and dewatering aids, bonding agents, thickeners, coagulants, emulsion breakers, defrackerers, frothers, and solvent extraction reagents



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## Productivity and Safety Hazards

Mine productivity is directly influenced by water quality, and by the ability to control or affect water quality at reasonable cost. When large volumes of water are in play, cost escalates. Many users report a need to maintain high water flow rates while still imposing some kind of treatment regime, in order to maximise efficiency and profits.

Health problems posed by chemical handling can range from nausea and eye/sinus irritation to chronic conditions of skin and lungs. Fatigue from, and dissatisfaction with high chemical loads may impede an operator's attention to safety details. So even while water is a perfect carrier for minerals, when chemicals are added it needs to be contained in

pipes for working with it to be safe, as well as to minimise evaporation. Pipe replacement is a hazard in itself, because workers are then exposed to the pipes contents, and companies also face considerable downtime in pipe maintenance.

## Introducing Hydrosmart, electronic antiscalant and dissolution technology

Hydrosmart is a physical water treatment system that replaces or augments chemical use, minimising the amount of a chemical that may be needed for an application. Pipe sections wrapped with coils are inserted to an operations' existing pipe system, and a computer controlled set of resonance frequencies are generated, that pass through the pipe into the water and mineral mix, without any wiring contacting the water. Frequencies break the ionic bonds between minerals, because precise electrical and magnetic

fields are generated. Any mineral can be successfully affected provided the mineral is partly dissolved already or has been previously laid down by precipitating from solution.

In one instance, chemicals were being used for dewatering at a gold mine that handles 2 mega litres of water in the system per day. The 110 mm pipe, which carried a load of 29000 ppm minerals, was scaled to a thickness of 15mm.



“Australia’s three biggest mining companies use Hydrosmart on campsites (each housing 5-2000 people) for scale prevention and infrastructure protection”

## Electronic antiscalant and dissolution technology

Chemicals weren't doing the job and scaling was getting worse. The supervisor reported that installation of a Hydrosmart “not only prevented any additional buildup of scale, but actually removed the existing 15 mm of scale such that the pipe is now back to a bare black poly pipe”.

At another gold mine where ore dust from trucks ends up in a concrete sump in the ground, sludge

was building up in the sump and generated noxious odours. High levels of chlorine were being used but were still not helping, and in fact only made odours worse and the situation more risky. Installation of Hydrosmart removed the odour and enabled chlorine to be discontinued.

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people) for scale prevention and infrastructure protection. Forays into the use of the physical water treatment on oil and gas recovery applications have been ongoing overseas, and the replication of these installations here at home is an exciting new area of potential.