

Great leap forward in water treatment

Top quality tap water is flowing from a new South Australian technology described by some industry experts as "the best development in water treatment in 50 years".

Residents in the Adelaide Hills are receiving clean and filtered water from a \$7.5 million water treatment plant using world-first technology and reducing the need for chlorine disinfection. The plant at Mt Pleasant has seen SA Water roll out its MIEX (magnetic ion exchange) resin technology, which reduces the level of dissolved organic carbon (DOC) in drinking water, the main cause of colour, taste and odour.

Cost effective management of DOC is one of the key challenges facing today's water treatment industry. Traditional solutions involve the application of complex water treatment processes with large operating costs. Generally only half the organic matter is removed, which can leave the remainder to react with disinfectants used in water treatment, producing undesirable tastes and odours.

MIEX is different. Simple and cost effective, the water authority says trials

have removed up to 80 per cent of colour and, by adding a small amount of alum in the treatment process, 70-80 per cent of DOC.

The resin is in the form of tiny acrylic beads which have a positive charge and negative chloride ions bound onto them. When mixed with water, the DOC ions, which are negative, displace the chloride ions on the resin, which then rapidly settles out of the water. Minute quantities of chloride ions are released into the water, but insufficient to alter its conductivity.

The DOC coating the beads is easily removed, allowing them to be recycled back into the process stream. It is particularly effective in removing the low molecular weight fraction of DOC that cannot be removed by traditional enhanced coagulation methods.

The process can provide very competitive plant capital and operating costs compared with other advanced water treatment processes. It reduces the required levels of chemicals such as chlorine, a key advantage in export markets like the US, where the EPA has

brought in tough new regulations on chlorinated by-products.

RESEARCH AND DEVELOPMENT

MIEX was developed at the Australian Water Quality Centre in conjunction with Orica (formerly ICI) and the CSIRO. The national science organisation first developed the process that is the basis of MIEX resin in 1967, before Orica obtained an exclusive licence and began research focussed on industrial water softening applications. In the 1970's SA Water suggested the magnetic resin could be applied to removing DOC.

Orica worked with CSIRO to develop a specially formulated MIEX resin for this purpose, and with SA Water, to develop the application. A pilot plant in Adelaide enabled the development of the MIEX resin process and demonstrated that the process had the necessary operability, economics and scalability in both greenfield and retrofitting situations.

The Mt Pleasant plant is the first full-scale project. The 2.5 megalitre a day Mt Pleasant plant incorporates two treatment streams, one conventional and one using microfiltration, to see how MIEX performs with each. SA Water hopes to capitalise on its design experience when Orica takes the technology to the US and European markets.

We have achieved 50 per cent DOC removal in River Murray Water, together with up to 80 per cent colour removal. With the inclusion of a small amount of alum in the water treatment process we have achieved 70 to 80 per cent removal of DOC. ■

