

Maximising RO recovery using a new antiscalant for high sulphate waters

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Received 29 April 2009; Accepted in revised form 30 July 2010

ABSTRACT

Despite the current economic turmoil the need for good quality drinking water continues relentlessly. In the last eight years 11,825 reverse osmosis (RO) plants have come on line with a combined output of 25 million m³/d. Although large seawater plants take most of the 'desalination news, awards and headlines', a large number of small and medium sized plants (requiring less energy) are being commissioned that use other water sources. Recent data shows that some 8,500 of these systems are producing 62% of the extra water capacity installed since 2000; these plants use brackish, surface or waste water as a feed source. The increasing demand for the minerals that are found in arid and desert areas has increased the need for desalinated water in many mining areas. In these regions ground waters frequently contain high levels of calcium, magnesium, silica and sulphate; in such cases water desalination increasingly demands speciality antiscalants and dispersants. This paper examines the use of new antiscalant compounds developed specifically to inhibit the formation of calcium sulphate. The chemistry and deposition mechanisms are presented along with details of formulating Genesys CAS a sulphate specific antiscalant. Results from an operating plant are presented showing the improvement in plant performance and a simple model is developed to equate the improvement in plant operation associated with high recovery to actual cost savings. Membrane systems will continue to be built and operated with increasingly poorer quality feed waters. For this reason it is essential that new and improved speciality antiscalants are developed so that plants can continue to operate at their highest efficiency thereby saving water and energy.

Keywords: Antiscalant; Chemicals; Silica; Calcium phosphate; Calcium sulphate; Brackish water; Recovery rate; Reverse osmosis; Membrane

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