

# Performance of tubular reverse osmosis for the desalination/concentration of a municipal solid waste leachate

JJ Schoeman<sup>1\*</sup> and LJ Strachan<sup>2</sup>

<sup>1</sup> University of Pretoria, Department of Chemical Engineering, Water Utilisation Division, Pretoria 0002, South Africa

<sup>2</sup> Durban Solid Waste, Durban Metro City Council, PO Box 1038, Durban 4000, KwaZulu-Natal, South Africa

## Abstract

Municipal solid waste leachate (MSWL) has the potential to pollute the water environment and to affect biological treatment processes adversely if not properly handled. Reverse osmosis (RO) has the ability to remove both organics and inorganics effectively from effluents. Therefore, RO was evaluated for the treatment of MSWL. It was found that both cellulose acetate and polyamide RO membranes should function effectively for the treatment of the leachate and that it should be possible to control membrane fouling with chemical cleaning. The polyamide membranes, however, performed somewhat better than the cellulose acetate membranes for the treatment of the leachate. The quality of the treated leachate with the exception of ammonia-nitrogen and COD should comply with the quality requirements for discharge into the water environment. Biological treatment processes are effective in complete removal (to only traceable levels) of ammonia-nitrogen and biodegradable COD. The quality of the treated effluent further complies with the quality requirements (chloride and heavy metals) for discharge into the municipal biological treatment system. The capital and operational cost of a 250 m<sup>3</sup>/d tubular reverse osmosis (TRO) plant is estimated at R1.95 m. and R11.45/m<sup>3</sup>, respectively.

**Keywords:** reverse osmosis, leachate treatment, membrane fouling, membrane cleaning, effluent quality, treatment costs