Capacitive Deionization Technology: A Cost Effective Solution For Brackish Ground Water Remediation

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Biographical Sketch of Author
Tobie Welgemoed is a design/project engineer with the consulting engineering firm Lee & Ro, Inc in San Diego. Tobie graduated as a Chemical Engineer from the University of Pretoria, South Africa in 1992. He has since completed another degree in Water Utilization Engineering (2001) and is in the process of completing his MS in Environmental Engineering. Tobie currently designs water and wastewater treatment facilities, as well as infrastructure for the Lee & Ro, Inc branch in San Diego, CA. His specialty area's include the design and operational optimization of domestic and industrial waste water treatment facilities, specifically via technologies like biological nutrient removal, advanced precipitation, adsorption and membrane processes. Tobie also has extensive experience in the design, construction and operation of potable water treatment facilities with "difficult to treat" sources waters like polluted river water, brackish and sea water. Integrating the above-mentioned capabilities and technologies also allowed Tobie to prepare and implement water quality management programs in South Africa.

Abstract
Capacitive Deionization Technology (CDT) represents a breakthrough in desalination of brackish source water as compared to existing technologies like RO and EDR. The energy requirement is low and CDT could be an attractive alternative in remote areas where mobile treatment units could utilize solar energy, due to the low energy requirements.

A laboratory scale test for the remediation of coalbed methane wastewater from the Powder River Basin was conducted to demonstrate the capability of reinsertion into the aquifer with EPA specifications. Sample water from coalbed methane type sources was tested using a bench scale CDT treatment system. Samples of the feed water and treated water were analyzed. Water analysis showed a significant reduction in overall TDS levels with only a fraction of the energy required as compared to other technologies like RO and EDR. Test work indicated that the estimated energy consumption could be lower than 2.25 kWh/1000 gallons for typical coalbed methane type brackish feed water. In addition, the waste material was concentrated to a level of 18,000 ppm, thereby, reducing the handling costs of wastewater. The pilot plant could be designed as a mobile unit, as the treatment of coalbed methane wastewater would be site specific for a limited period of time at each site. Further testing was also conducted at the first commercial pilot of a CDT system at the ENCINA WATER POLLUTION CONTROL FACILITY in Carlsbad, California. For additional information please visit : http://www.cdtwater.com