

FIRST REPORT

# Can a new ion exchange system cause a stir?

This month GWI takes a look at a novel ion exchange process that can supposedly replace reverse osmosis in some applications, as well as recovering materials from waste streams.

## KNEW PROCESS AND NO-BRINER

### KNEW COMPANY

San Diego-based KNeW Company, formed in 2013, is bringing to market a variant on conventional ion exchange, aimed at treating brackish waters and mining effluents while creating a saleable fertiliser product. The product is targeted as both an alternative and complementary to RO.

Instead of a column configuration used in most ion exchange applications, the KNeW Process uses continuous stirred tank reactors running in a counter current configuration (patented as the ZIX-Zak process) to treat high dissolved solids concentrations – up to 20,000 mg/L TDS is claimed. As well as a catex and anex ion exchange plant, the KNeW Process consists of a regenerant section and a chemical step to convert the regenerant into fertiliser and other by-products, such as potassium nitrate, ammonium sulphate, ammonium chloride and gypsum.

The technology has also been adapted into the No-Briner process, which is used for RO pretreatment by removing the calcium from the feedwater so that only sodium sulphate or sodium chloride remain, reducing the threat of scaling on the membranes. The RO brine – consequently having a high sodium concentration – is used for regeneration of the calcium loaded IX resins. The KNeW chemical step is then applied to the regenerant to produce fertiliser.

The company has tested synthetic water of comparable quality to that found in ground-water around Rio Rancho, New Mexico, where the KNeW Process treated feedwater with 13,000 mg/L TDS, reducing it to 20 mg/L of sodium and chloride only. It has also tested performance on acid mine drainage at its demonstration facility in South Africa, claiming to produce “almost pure water” from a feedwater of 25,000 mg/L TDS.

Conversations are currently ongoing to duplicate its South Africa pilot plant at the Brackish Ground Water National Desalination Research Facility in New Mexico, as well as discussions with several mining companies. After third party validation of technology performance claims, the KNeW Company will be ready to enter the market and is seeking institutional and equity investors. A tentative agreement with a major fertiliser distributor has been agreed for offtake of potassium nitrate produced by the KNeW Process.

### EXPERT COMMENT

The economics of any RO process are a function of its recovery and cost of brine disposal. RO recovery is higher when the feed calcium and sulphate are reduced. A solution to brine disposal is reuse, such as an ion exchange regenerant in the “No-Briner” process, and, when possible, chemically converted to saleable fertiliser. The KNeW Company offers a promising solution.

*Tony Wachinski, Wisewater Global*

**Treatment category:**

**Potential applications:**

**Potential industries:**

**USP:** The KNeW Process converts all desalinated salts into products with a commercial value. The No-Briner uses RO concentrate to regenerate the ion exchange resins, reducing waste streams.

**Funding stage:** Seed. Looking to raise more money.

**Stage of development:** Pilot testing with third parties.

**CEO:** Aubrey Howard  
**Inventor:** John Bewsey  
**Website:** [www.theknewco.com](http://www.theknewco.com)

**Star rating:**

## ICON KEY

Treatment categories:	Applications:	Industries:
Dissolved solids removal	Desalination	Municipal
	Wastewater	Mining

**Star rating system:**

- Unrated
- Interesting
- Worth a detour
- Worth a journey