



MIEX® PRESS

December, 2004 • Issue #9

A Letter From the Editor

Holiday Greetings and welcome to the December issue of MIEX®PRESS! I'd like to first take this opportunity to introduce myself as the new editor for MIEX®PRESS. I recently joined the Orica Watercare team in November, and I look forward to sharing the latest MIEX® news updates with you.

This is a very exciting time for the Watercare team, as interest in the MIEX® Process continues to build momentum and the technology continues to gain traction in the water industry. The numerous papers presented on the MIEX® Process at the AWWA WQTC in November are prime examples of this increasing interest- in all, a total of nine papers were presented that covered MIEX® trials

and full scale installations!

In this issue of MIEX®PRESS, we will showcase the recent approval of the first MIEX® treatment plant in California, as well as discuss groundbreaking modifications to the MIEX® Process that will make it more cost effective and efficient. Also, be sure to check out the update on the start up of the two Village of Palm Springs treatment plants in Florida.

In closing, all of us from the Watercare team would like to wish you a very joyful holiday season and a new year full of prosperity and happiness. We are incredibly grateful for all your support this past year and look forward working with you in 2005.

Please feel free to contact me with any questions or comments you may have on this edition of MIEX®PRESS.

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First MIEX® Installation Approved in California by the City of Vallejo

On December 7, the Vallejo City Council approved the signing of a contract to install a 1 MGD MIEX® Treatment System at the Green Valley Water Treatment Plant. This approval follows a very successful trial carried out in spring/summer this year which showed that distribution disinfection by-product levels could be significantly reduced using MIEX® pretreatment followed by the existing treatment plant. These trial results were reported in our October newsletter that can be found on www.miexresin.com.

This is a very exciting step forward for the MIEX® Technology in California where several trials have been conducted this year and more are in the pipeline for 2005. The decision by the City of Vallejo to install a MIEX® Treatment system came after recent approval by

the Californian Department of Health Services for use of the MIEX® Technology in California for Disinfection Byproduct (DBP) precursor removal to meet the EPA DBP regulations.

"After an exhaustive review of the best available technologies to meet the current and future D/DBP regulations we believe the MIEX® pretreatment process is the best fit for the Green Valley Water Treatment Plant."

Franz Nestlerode, Deputy Water Superintendent for the City of Vallejo

"After an exhaustive review of the best available technologies to meet the current and future D/DBP regulations we believe the MIEX® pretreatment process is the best fit for the Green Valley Water Treatment Plant," said Franz Nestlerode, Deputy Water Superintendent at the City of Vallejo.

The other technologies considered by the City were enhanced coagulation together with the use of chloramines and granular activated carbon contactors. The Green Valley Water Treatment Plant will



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Commissioning of First US MIEX[®] Installations Underway!

The first two MIEX[®] treatment plants to be installed in the United States are near construction completion in Palm Springs, Florida. Commissioning and water testing activities at both the Pratt and Main Water Treatment Plants has been underway since



RL Pratt WTP MIEX[®] Contactor & Settling Vessels

early November. The first batch of MIEX[®] resin was loaded into the Main plant in early December. At the time of writing, the resin inventory for each plant was being regenerated prior to bringing the plants on-line to treat raw water. It is expected that



RL Pratt WTP Resin Regeneration Tanks

both plants will start treating raw water using the MIEX[®] resin during the week of December 20th at limited capacity, in conjunction with on-site training of the operations staff. Full treatment of the raw water using MIEX[®] resin will likely begin early in the New Year.

Launch of High Efficiency Regeneration System:

Significant Capital & Operating Cost Reductions

In the spirit of always striving to provide more cost effective customer solutions, Orica Watercare has developed and patented an enhanced MIEX[®] resin regeneration system. This system, known to our engineers as G2 (Generation 2), will provide multiple benefits to the MIEX[®] Resin DOC Removal Process. These benefits include:

- ◆ Lower capital and installation costs; smaller footprint required
- ◆ Modular design of equipment- preassembled, simpler and less expensive installation
- ◆ Reduced waste volumes
- ◆ Reduced salt consumption
- ◆ Lower resin inventory
- ◆ Less complex MIEX[®] plant design
- ◆ More redundancy provided

The G2 Regeneration system uses a special regeneration sequencing technique to maximize the DOC concentration in the waste brine, thus reducing waste volumes by over 50%. The changes also significantly reduce batch cycle time, thus allowing the smaller footprint system with smaller tanks. After regeneration, the resin returns to service having received a better quality regeneration than in the previous process.

The previous MIEX[®] regeneration facility required the regeneration system to be designed in detail by consultants to fit the site-specific constraints. G2 moves away from this by having a standard regeneration unit design. The number of standard units then required is dictated by the MIEX[®] system capacity.

AWWARF Project Update: Palmdale Water District, CA

In May of this year Carollo Engineers began a 7 month MIEX[®] pilot trial at the Palmdale Water District, Palmdale, California. The trial was part of the AWWARF TC Project entitled "DBP Control using Advanced Water Treatment Processes Downstream of an Estuarine Water Source," and utilized the first of Orica Watercare's new trailer mounted 5-gpm pilot plants. The MIEX[®] Process was one of three technologies selected for the study.

The raw water supply for the Palmdale Water District's water treatment plant is mostly State Project Water (SPW) and during summer months the treated water

Total Trihalomethane (TTHM) levels can exceed the EPA Standard when using free chlorine for disinfection. The key area of investigation was the ability of the MIEX[®] Process to remove dissolved organic carbon (DOC) and bromide, both dominant precursors present in SPW for the formation of TTHM. Bromide is of great concern for users of SPW who wish to remain on free chlorine, as it been shown to shift the speciation of TTHMs and haloacetic acids (HAAs) towards the more harmful brominated forms after DOC is removed, and also to increase the mass concentration of the total TTHMs and HAAs due to the higher molecular weights of the brominated species.

During the trial, Carollo Engineers, with assistance from Orica Watercare field engineers, investigated a wide range of operating parameters to determine the optimum MIEX[®] treatment conditions. Under optimized conditions the MIEX[®] pilot was able to remove an average 60% of the DOC and 25% of the bromide from the raw water, at ambient levels of 3-4 mg/L and 180-200 µg/L respectively. Trial results are present-

ed in Figure 1 below.

In an attempt to simulate historically high bromide levels, Orica Watercare conducted jar testing of Palmdale raw water, with bromide levels spiked to approximately 400 µg/L. This testing also gave the opportunity to trial the performance of resin regenerated using Orica Watercare's new high efficiency G2 Regeneration System. The results of the testing were very positive, with the G2 regenerated resin performing equally as well as resin regenerated with fresh brine, and showing approximately 10% greater bromide removal than resin regenerated with brine

used nine times. The raw water feed to the pilot plant was also spiked but results are not yet available.

The optimized MIEX[®] Process when coupled with conventional ferric chloride coagulation on the pilot scale was comfortably able to reduce the TTHMs to less than the EPA Standard of 80 µg/L, using a 72 hr incubation period to determine formation potentials under simulated distribution system conditions. Under spiked bromide jar test conditions, similar positive performance was also seen.

In November, preliminary trial results were presented by Stephen Booth, Project Manager, of Carollo Engineers at WQTC in San Antonio, Texas. The draft final study report is expected to be presented by Carollo to AWWARF in March 2005, and be formally published by late 2005.

Acknowledgements:

Stephen Booth, Cristina Fonseca and Justin Sutherland of Carollo Engineers & Bo Labisi of Palmdale Water District.

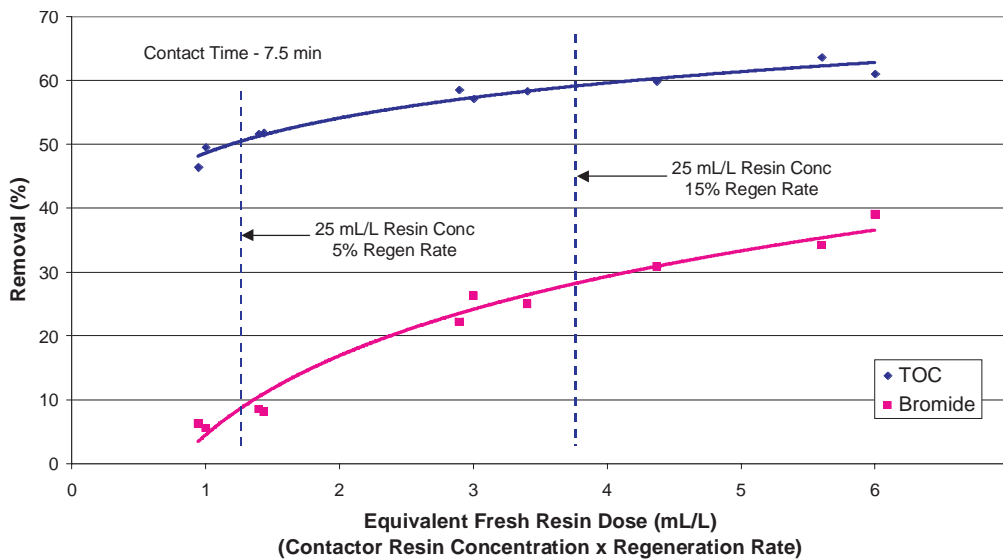


Figure 1: TOC and Bromide Removal Performance. Note: Results are averages for a given set of MIEX[®] Treatment Operating Parameters.

City of Vallejo (FROM PAGE 1)

be out of compliance with the EPA Stage 1 D/DBP Rule when the first full year of DBP monitoring for small systems is reported on January 1, 2005. "We are anxious to have the MIEX[®] system startup up as soon as possible so that we can bring the Green Valley Plant back into compliance." Franz said.

On-site construction of the MIEX[®] treatment system will commence in early spring and plant startup is expected to commence sometime during the summer of 2005. Watch this newsletter for further project updates.

MIEX[®] Trivia

MIEX[®] Regeneration Chemistry

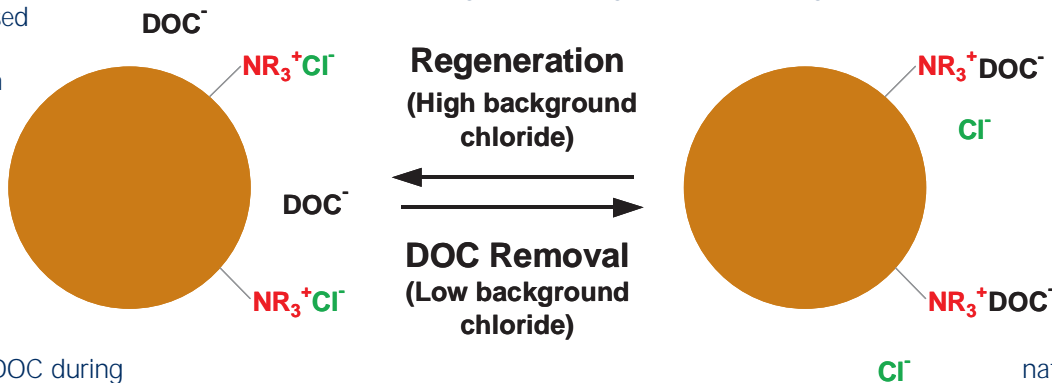
One of the benefits of the MIEX[®] Process is that the resin can be regenerated many times over. This makes the MIEX[®] Process very cost effective due to the greatly increased life of the resin in the system.

In the regeneration process, DOC-laden resin is contacted with brine solution (NaCl or KCl) to remove the DOC from the resin. The resin can then be returned to the water treatment process to remove more DOC from raw water. The brine regenerant itself is reused

many times, in combination with a fresh brine rinse, leading to very low volumes of waste created by the MIEX[®] Process.

But how can chloride replace DOC during regeneration when the resin is far more selective for DOC during water treatment? The answer lies in the concentration of chloride ion in the brine compared to raw water.

In the MIEX[®] Process, DOC can replace chloride on the resin simply because of the resin's very high selectivity for DOC. The low background level of chloride doesn't challenge the uptake of DOC from raw water. However, the concentration of chloride ion in the regenerant brine is typically thousands of times higher than in raw water. This means that in the regeneration process, chloride literally forces its way back onto the resin, displacing DOC into the regenerant solution.



This is known as "selectivity reversal" and, as shown in the schematic displayed, this effect combined with the resin's natural selectivity for

DOC allows the resin to be reused many times over for DOC removal from raw water.

Employee Spotlight:

Farewell to James Kennon & Dr. Matt Carr

James Kennon has been with the U.S. Watercare team for two and half years and has devoted much of his time to working on trials. He will undoubtedly be remembered by many plant operators and engineers for his ingenuity in keeping pilot plants operating and for his Aussie sense of humor. Matt Carr, during his 18 months here, worked primarily on the use of MIEX[®] resin for inorganics removal. As a mad sports fan,

Matt will miss the 24-hour sports coverage in the U.S., but his wife Julia is sure--with time--he'll adjust to life without it.



Dr. Matt Carr



James Kennon

Both James and Matt are returning to Australia to continue their work with the Watercare business and we thank them for their important contributions to the introduction of the MIEX[®] technology to the U.S.

Conference Schedule

Come see us! We will have booths at the following conferences in March and we look forward to seeing you there.

The Membrane Technology Conference & Exposition

March 6-9, 2005

Phoenix Civic Plaza Convention Center
Phoenix, Arizona

The South Carolina Environmental Conference

Embassy Suites at Kingston Plantation

March 20-23, 2005

Myrtle Beach, South Carolina