



MIEX[®] PRESS



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Letter from OWI President

I would like to extend season's greetings from the entire Orica Watercare team.

Looking back, 2008 has been an exciting year for the MIEX[®] Technology with 7 new systems starting up in the U.S and several more currently under construction. The MIEX[®] Technology continues to expand around the world, with the first UK installation currently being commissioned and a contract for another two systems secured.

In this issue you'll find the results of a new Florida system start-up as well as news of our first order in the New England region. We also bring you information on extending GAC life with MIEX[®] Pretreatment.

Thank you for helping to make 2008 such a successful year for us. We wish you and your families a very happy and safe holiday season and look forward to working with you in 2009.

Best Regards,

Shane Jones

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Black & Veatch Secures Contract for MIEX[®] Systems in the UK

Black & Veatch has been awarded a contract by Yorkshire Water to design and build two MIEX[®] Installations at Yorkshire Water's Graincliffe (65 MLD) and Ewden (45 MLD) water treatment plants.

Both of these plants have existing dissolved air flotation (DAF) treatment systems that suffer from a high dissolved organic carbon (DOC) loading, particularly in the winter. The MIEX[®] Systems will be used

to remove DOC ahead of the DAF plants, which will allow the water treatment plants to meet all treated water quality requirements at full flow.

"This announcement brings the number of MIEX[®] plants Yorkshire Water is building to three with a 60 MLD system currently being commissioned at its Albert WTP," said Tony Price, General Manager for **(See UK Systems on Pg 2)**



Figure 1: 60 MLD MIEX[®] System at Yorkshire Water's Albert WTP, the first of three MIEX[®] Plants to be installed by 2010

MIEX® System Removes DOC & Sulfide at Wedgefield, FL

In 2005, the community of Wedgefield had a problem with elevated disinfection by-products, specifically total trihalomethanes (TTHM).

In December of that year, Wedgefield Utilities Inc. converted its disinfection method from chlorine alone to chloramines. With this modification, the Utility temporarily came into compliance with the TTHM regulations. However, due to the detrimental effects of chloramines on the distribution system and customer complaints, the Utility continued to look for a more permanent solution.

Wedgefield also had a problem with total sulfides, which made the water taste and smell unpleasant. The Utility therefore tested MIEX® Treatment for the removal of both sulfides and

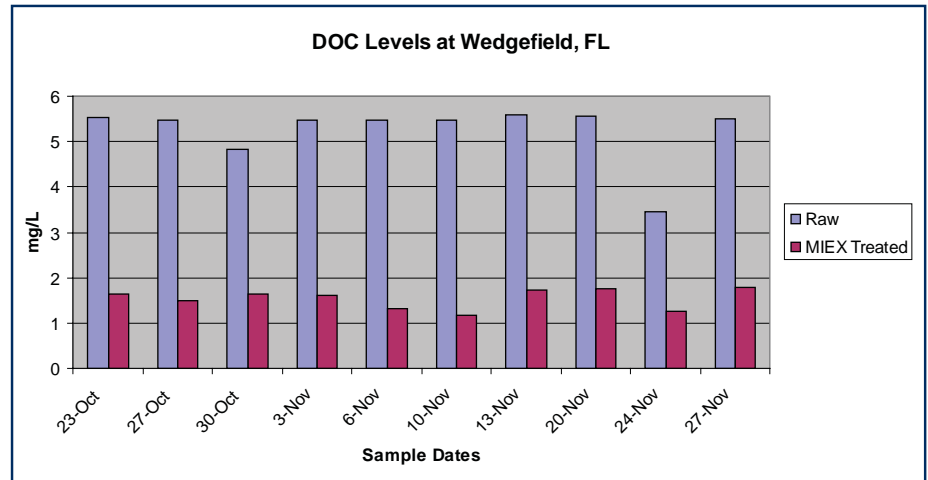


Figure 2: Comparison of DOC levels for raw water vs. MIEX® treated water after MIEX® Start-up

dissolved organic carbon (DOC) in 2007. It was determined from the pilot study that MIEX® Treatment effectively removed both the DOC and total sulfide from the raw water, at average rates of 61% and 98% respectively.

In July 2008, a MIEX® System was installed at Wedgefield, significantly improving the aesthetic quality of the water. In addition, MIEX® Treatment has allowed the Utility to switch back from chloramines to chlorine for disinfection, while maintaining compliance with TTHM standards.

Since start-up, samples have been taken upstream and downstream of the MIEX® System to measure removal efficiency of total sulfides and DOC. The samples indicate that the MIEX® System removes 96% of the total sulfides, and the TTHMs are below the Maximum Contaminant Level of 80 ppm.

Also, the amount of chlorine used daily before the installation of the MIEX® System averaged about 100 gallons per day. Since the MIEX® System has been in service, chlorine usage has averaged about 25 gallons per day, a decrease of 75%.

UK Systems

(As continued from Pg 1)

Orica UK Ltd. When the Graincliff and Ewden systems come online in March 2010, the combined capacity of Yorkshire Water's three MIEX® Plants will be 170 MLD (45 MGD). "We are excited to be able to work with such an internationally respected engineering firm as Black & Veatch in providing state-of-the-art water treatment systems for Yorkshire Water," said Price.



Figure 3: 1.4 MGD MIEX® Treatment System at Wedgefield, FL



IWC & WQTC Shows

Orica Watercare exhibited at the International Water Conference (IWC) in San Antonio, TX where it featured the MIEX® Technology as it is used in numerous industrial applications.

The MIEX® Process was also featured at the Water Quality Technology Conference (WQTC) in Cincinnati, OH, where 3 MIEX® Papers were presented in the technical sessions.

First MIEX® Installation in the New England Region

An order was received in September for the first MIEX® Installation in the New England region. The Newport Water District in Maine requested a 400 gpm MAGNAPAK® System to meet current and future EPA DBP Standards.

The system will be installed as pretreatment to a slow sand filter plant and will provide additional benefits of color and taste removal.

Sodium bicarbonate (baking soda) will be used for resin regeneration and will allow for disposal of waste to the sewer.

Wright-Pierce has been selected to oversee the installation, with completion scheduled for June 2009.

MIEX® Project Selected for Engineering Excellence Award

The Florida Institute of Civil Engineers (FICE) has awarded Jones Edmunds the 2009 Engineering Excellence Grand Award for the MIEX® Installation at the H. Clay "Junk" Whaley, Sr. Memorial Water Plant in St. Cloud, Florida.

The City of St. Cloud's water had been out-of-compliance with EPA rules for nearly two years, but they were brought back in compliance after only four days of the MIEX® Plant being online. The plant reduces chlorine demand by over 80%, removes over 60% of the raw water DOC, eliminates 98% of odor, reduces total sulfide to non-detectable levels, and removes virtually all color.

Orica Employee Embarks on Cross-Continental Trek to Raise Support & Awareness for WaterAid in Mali

Tom Williams based out of our UK Watercare office is embarking on an adventure through the African Sahara to raise support and awareness for WaterAid in Mali.

Departing from the UK on Saturday, December 20th, Tom will traverse through seven countries (France, Spain, Morocco, Western Sahara, Mauritania, Senegal, and Mali) as he makes his way to the final destination of Timbuktu, Mali. The road trip

will take three weeks to complete and will end with a round table charity auction of the vehicles used for the journey.

For more information about Tom's trek, you can visit the Facebook group Monty's Last Stand. If you'd like to support Tom in this endeavor, please visit www.justgiving.com/montyslaststand. And finally to learn more about the work that WaterAid does in Mali, you can visit <http://www.wateraid.com/mali>.



Figure 4: Tom Williams and the vehicle he will be donating at the close of his journey

Use of MIEX® Pretreatment to Significantly Reduce GAC Replacement Costs

In order to comply with the EPA's upcoming Stage 2 Disinfection Byproducts Rule, a number of water utilities have installed granular activated carbon (GAC) adsorbers as a polishing step at the end of the treatment plant to remove additional total organic carbon (TOC), a precursor to DBP formation. GAC adsorption is a proven means of reducing treated water TOC levels to achieve the EPA DBP standards and is mentioned in the Stage 2 DBP Rule as a best available technology (BAT) for achieving compliance.

Significant increases in the price of GAC as well as faster than expected carbon exhaustion rates have driven many utilities that have installed GAC adsorbers to investigate ways to extend the GAC service life to reduce operating costs. As the GAC service life is directly proportional to the TOC loading, attention has been focused on reducing the amount of TOC that the GAC is required to remove. Viable pretreatment options to remove TOC include enhanced coagulation and the MIEX® ion exchange process.

Options to Remove TOC and Extend GAC Life

Enhanced coagulation is the practice of increasing coagulant dose and/or lowering coagulation pH to optimize the removal of TOC. The extent of additional TOC removal that can be removed over conventional coagulation practices is limited in many cases due to the fraction of TOC in the water source that is amenable to removal by coagulation, primarily larger molecular weight (>3kDa) hydrophobic organic acids. The MIEX® Process removes TOC by anion exchange and can typically remove both high (>3kDa) and low molecular weight (<3kDa) organic acids, independently of hydrophobicity, resulting in a greater net removal of TOC than enhanced coagulation. When used as pretreatment to an existing coagulation plant, the MIEX® Process can

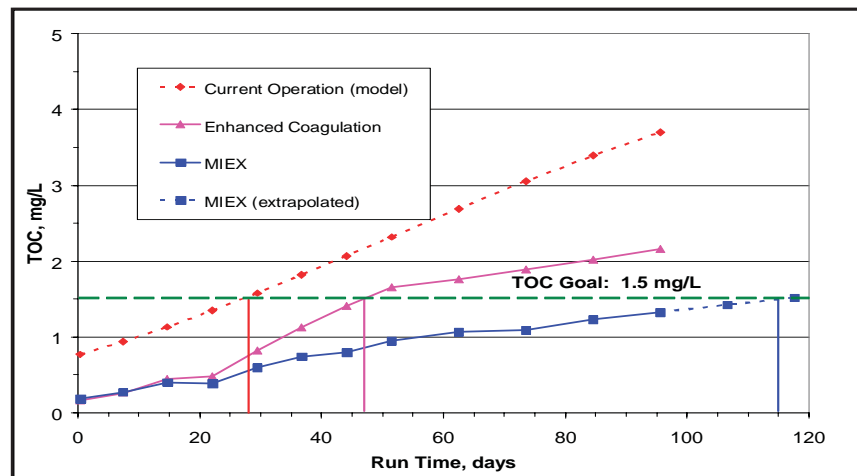


Figure 5: Effect of Pretreatment on GAC Service Life

often reduce downstream coagulant doses by up to 80% while resulting in a lower final treated water TOC than could be achieved with enhanced coagulation. As the GAC service life is directly proportional to the TOC loading, pretreatment with the MIEX® Process will therefore allow a longer GAC service life than enhanced coagulation.

Impact of MIEX® Pretreatment on Three Water Sources

Several pilot and laboratory studies have been carried out to determine how much the GAC service life can be extended with pretreatment options consisting of coagulation alone, MIEX® Treatment alone and MIEX® Treatment followed by coagulation.

A laboratory study was conducted on Salt River Project (SRP) water, a major water source for the Phoenix area, to evaluate the impact that different pretreatment options would have on the service life of GAC adsorbers. The raw water TOC level in SRP water currently ranges from 4.5 to 5.5 mg/L. The target treated water TOC level was set at 1.5 mg/L to achieve the EPA TTHM standard under simulated distribution system (SDS) disinfection conditions. Rapid Small Scale Column Tests (RSSCT) were conducted to simulate TOC removal that

would be achieved by GAC adsorbers at an existing water treatment plant with the various pretreatment options. The results of this study, shown in Figure 5, demonstrated that enhanced coagulation could extend the GAC service life from 28 to 47 days while MIEX® Pretreatment extended the service life by over 450% to 128 days.

Similar results were obtained in a bench scale study conducted by the University of Florence on a surface water source in Italy. RSSCT tests were conducted on coagulation/filtration treated water with and without MIEX® Resin pretreatment to compare the extent to which GAC filter life could be extended with MIEX® Pretreatment.¹ The results from this study showed that the GAC filter life could be extended by around 200% (Figure 6).

A two-year pilot plant study carried out at the Mt Pleasant WTP, South Australia investigated various combinations of coagulation/filtration, MIEX® Treatment and microfiltration as pretreatment to GAC adsorption.² This study demonstrated that the final treated water TOC after GAC adsorption was lowest in all instances where MIEX® Pretreatment was used. These results suggest that either;

(See MIEX® Pretreatment on Pg 5)

MIEX® Pretreatment to GAC

(As continued from Pg 4)

1. There is a fraction of TOC removed by the MIEX® Resin that cannot be removed by GAC or;
2. The MIEX® Resin removes a fraction of TOC that quickly blocks the GAC micropores and prevents the adsorption of uncharged and smaller TOC molecules

Lower TOC levels in the GAC effluent after MIEX® Resin pretreatment compared

to pretreatment with coagulation indicate that MIEX® Resin will provide greater synergies with GAC adsorption, allowing a longer GAC service life. This study also demonstrated that the THM Formation Potential of GAC effluent can be significantly reduced after MIEX® Pretreatment (Table 1).

Conclusions

Three studies conducted on different

Table 1: THM Formation Potentials for various pretreatments before and after GAC filtration (20 min EBCT)

| TTHMFP (µg/L) | Raw | Coag | MIEX + Coag |
|---------------|-----|------|-------------|
| Before GAC | 156 | 105 | 35 |
| After GAC | - | 89 | 5 |

water sources all demonstrated that the TOC removal provided by MIEX® Resin pretreatment can extend the service life of GAC in the range of 200 to 450%. Through removing a fraction of TOC that cannot be removed by coagulation or GAC, MIEX® Pretreatment will also dramatically reduce final treated water disinfection byproduct levels. With significant increases in carbon prices in recent times, MIEX® Pretreatment to GAC can therefore significantly reduce operational costs due to extending the GAC service life and eliminating the need for enhanced coagulation.

Article Resources

¹ Sani, B; Rossi, L; Lubello, C; Zacchei, S; "Effects of ion exchange resin pretreatment on GAC adsorption," IWA WWCC & Exhibition, Sept 2008, Vienna, Austria.

² M Drikas; M Dixon; J Y Morran; "The Impact of MIEX Pretreatment on GAC Performance," Australian Water Quality Center, South Australian Water Corporation, AWWA WQTC, Nov 2006.

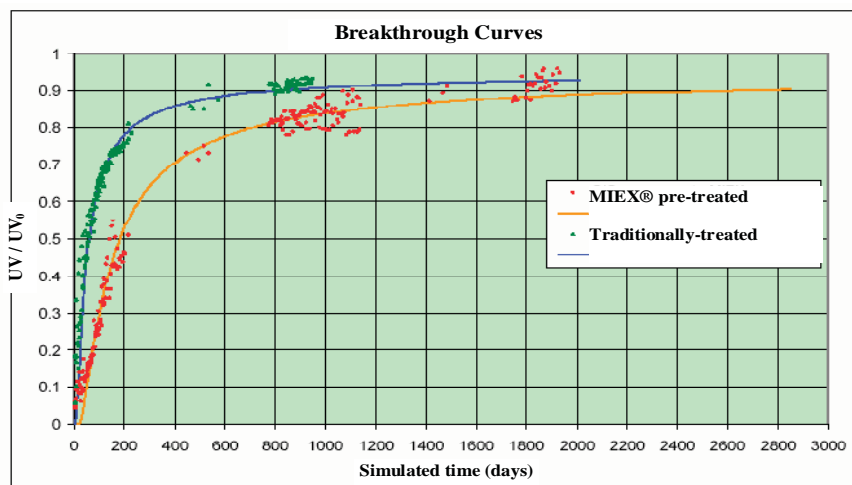


Figure 6: RSSCT Results for Coagulation and MIEX/Coagulation Treatment

Trade Show Schedule, Spring 2009

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|-------------------------|--------------------|-----------------------------------|
| Colorado RWA | February 16-19 | Shared Booth with Hydrologx |
| Minnesota RWA | March 3-5 | Shared Booth with Vessco |
| Banff Operators Conf | March 10-13 | Shared Booth with Mequipco |
| Membrane | March 15-18 | Orica Watercare Booth |
| Illinois AWWA | March 16-19 | Shared Booth with Peterson & Matz |
| Kansas RWA | March 24-26 | Shared Booth with Fluid Equipment |
| Missouri AWWA | March 29 - April 1 | Shared Booth with Ressler |
| New England | April 1-2 | Shared Booth with Tech Sales |
| North Carolina AWWA | April 5-7 | Shared Booth with Heyward |
| Florida Water Resources | April 5-8 | Shared Booth with Moss Kelley |
| CA/NV Spring Show | April 6-9 | Orica Watercare Booth |
| Texas AWWA | April 14-17 | Orica Watercare Booth |
| New York AWWA | April 27-30 | Shared Booth with Pro Aqua |