



MIEX[®] PRESS



What's Inside

Arab, AL System Start-up

Counter Current MIEX[®] Treatment System

ACE08 Show Highlights

MIEX[®] Technology in Canada

9-MGD Start-up, St. Cloud

Downstream Benefits with MIEX[®] Treatment

Letter from OWI President

As the new President of Orica Watercare Inc., I wanted to take this opportunity to welcome you to the April edition of MIEX[®]PRESS and to introduce myself. Prior to my appointment as President, I supported the Watercare team as the Engineering Director and VP of Sales. I am incredibly excited about the momentum of the MIEX[®] Technology and look forward to leading the business into the future.

In this issue we showcase two recent start-ups, our counter current system for the removal of less selective anions, and an update on the adoption of the MIEX[®] Technology in Canada. Also included is a feature article highlighting the significant benefits of using the MIEX[®] Technology upfront of other treatment processes.

In June, we will be exhibiting at ACE08 in Atlanta and hope to see many of you there. As always, we hope this issue finds you well. Please contact us with any questions regarding the featured articles.

Best Regards

Shane Jones

www.miexresin.com

6-MGD System in Arab, Alabama Commissioned in late March

Article as released by Water Tech Online April 2, 2008

ARAB, AL — This city in northeast Alabama has recently installed a high-capacity ion exchange pretreatment system for its water treatment plant that it says will significantly reduce formation of disinfection byproducts (DBP), according to March 19 article in the Arab Tribune cited by the system's manufacturer, Orica Watercare.

The 6 million gallons per day (mgd) MIEX[®] pretreatment system went into operation in March and substantially

reduces the amount of aluminum sulfate and chlorine that must be used at the Arab Water Works treatment plant downstream, the article said. As a result, formation of trihalomethanes (THMs), a type of DBP, is reduced between 70 to 80 percent, which Arab officials say puts them ahead of the 2012 US Environmental Protection Agency (EPA) deadline for compliance under Stage 2 DBP regulations.

"About \$30,000 in chemicals will be saved annually, and the pretreatment system didn't require adding another operator," Arab Water Works manager



Figure 1: Scott Mitchell of Orica (L) & David Campbell, Arab Water Works Manager (R)

David Campbell was quoted as saying,

Campbell said in the article that the city is proud of the new system and added that about 100 other water utility operators are interested in visiting it.

DBPs Reduced Significantly After 4 Days of MIEX® Treatment

The 9-MGD MIEX® System at the City of St. Cloud, FL started up in late March.

This is now the largest operational facility in the U.S. This new water treatment plant for the City of St. Cloud consists of MIEX® Treatment for total organic carbon and hydrogen sulfide reduction. The City installed the plant to expand capacity and ensure compliance with the EPA Disinfection By-Product (DBP) standards. Jones Edmunds & Associates, Inc., based in Tampa, Florida, designed the plant and managed the installation, while Wharton-Smith performed the construction.

First quarter distribution samples were taken only four days after MIEX® System



Figure 1: St. Cloud, FL 9 MGD MIEX® Treatment System

start-up. Even with only four days of MIEX® operation, TTHM & HAA levels were reduced dramatically over the previous quarter from 120 ug/L to 52 ug/L and 64 ug/L to 13 ug/L, respectively. These levels are below the MCLs and bring the City back towards final compliance with the EPA's DBP Requirements. Additionally, the reduction in HAAs caused the running annual average (RAA) to fall back under the required limits, while the running annual average for THMs

will easily be achieved after the 2nd quarter of MIEX® Treatment.

This is the first MIEX® Installation in the US to utilize both chloride and bicarbonate for regeneration. Bicarbonate regeneration has been implemented to allow for greater flexibility in waste disposal to the sewer. This is one of several concrete MIEX® Systems to go into operation in the US in 2008.

MIEX® Business Growing in Canada

On February 20 and 21st Manufacturer's Representative, Mequipco, hosted seminars in Edmonton and Calgary covering the topic of organics in drinking water. Representatives from several manufacturers presented on topics pertaining to organics removal and analysis in drinking water applications. Michael Bourke, VP of Marketing, represented Orica Watercare at these seminars and presented information about the use of MIEX® Treatment for DOC and DBP reduction. Approximately sixty people were in attendance including water utilities, consultants, and regulators.

DBPs are a growing concern in Canada. Health Canada has set the Maximum Allowable Concentration (MAC) for TTHMs at 100 µg/L, calculated as a locational running annual average. Additionally, the MAC for bromodichloromethane is 16 µg/L. HAAs are not yet regulated in Canada. As in the United States, increasingly stringent regulatory requirements for DBPs are driving interest in available technologies for DOC and DBP reduction, including MIEX® Treatment.

Orica Watercare will be presenting a paper at the 2008 BCWWA Annual Conference

this spring. Additionally, Orica Watercare is excited to announce the receipt of their first Canadian order from Suncor. Installation of the Suncor system at Fort MacMurray is expected to take place later this year.

Mequipco is Orica's local representative in the western Canada provinces of British Columbia, Alberta, Saskatchewan, Manitoba, Yukon Territory, Northwest Territories, and western Ontario. Pro-Aqua represents Orica locally in the province of Ontario, and APS is the local representative for Newfoundland, Prince Edward Island, New Brunswick, Nova Scotia, and Labrador.

Counter Current MIEX® System

The MIEX® Technology provides the most environmentally sustainable ion exchange process commercially available due to significantly lower energy requirements, salt consumption and waste residuals.

The continuous regeneration of resin in this process also eliminates the risk of chromatographic peaking (contaminant dumping) that can occur with traditional packed bed ion exchange processes. This is a significant benefit in nitrate and arsenic removal applications.

The Counter Current MIEX® System has been developed to continue providing these benefits in applications where very high contaminant removals are required or competing anions such as sulfate make it difficult to achieve a desired removal rate using a standard High Rate MIEX® System.

Process Description

The Counter Current MIEX® System consists of two or more High Rate fluidized bed reactor vessels connected in series. Raw water flows from vessel to vessel being contacted with resin of a higher capacity in each subsequent reactor vessel. Fresh regenerated resin is fed to the final reactor vessel while loaded resin is removed from this vessel at the same rate and sent to the preceding vessel. Loaded resin from the first reactor vessel in the series is sent to regeneration, hence providing a counter current MIEX® Resin treatment system (Figure 3).

The counter current contacting of raw water with MIEX® Resin allows more selective competing anions to be removed with partially loaded resin in the first reactor vessel so that fresh resin added to the final reactor vessel will remove less selective target anions such as nitrate and bromide. This configuration can also be used to remove high levels of more selective anions. The more efficient sequential loading of

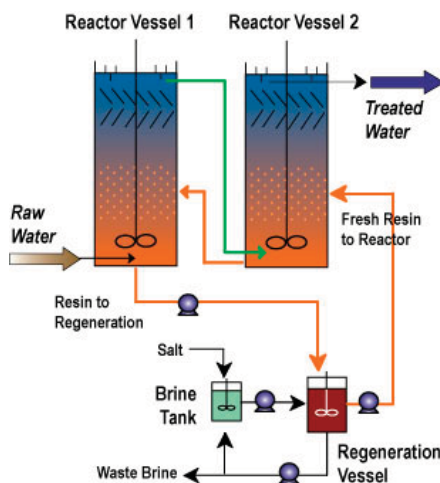


Figure 3: Flow Diagram of Counter Current MIEX® System

MIEX® Resin reduces the regeneration system size that would otherwise be required for challenging contaminant removal using a standard High Rate MIEX® System. This allows for significant reductions in waste volumes, salt consumption and operating costs.

Counter Current MIEX® Systems are available in plant sizes from as low as 25 gpm to at least 50 MGD. Counter current MIEX® Systems can be supplied as atmospheric/gravity flow systems for plant sizes of at least 50 MGD and as pressurized systems for plant sizes up to 10 MGD capacity. Skid-mounted packaged systems are available in module sizes up to 700 gpm while systems greater than 2 MGD are typically custom designed.

The performance of the Counter Current MIEX® System can be simulated in jar tests for feasibility test evaluations, and pilot plants of this configuration are available for trials.

ACE08 Highlights

The 2008 Annual AWWA Conference & Exhibit is fast approaching and will be held at Atlanta's Georgia World Congress Center, June 8th to the 11th. We are very excited about our prominent booth location this year near the entrance of the exhibit hall (**Booth #1301**) so be sure to stop by!

This year we will be featuring photos of many new installations. Eight new MIEX® Systems are set to be installed by the Annual Conference this year.

During show hours on Monday, we will be sponsoring the **ACE08 Cappuccino Cart**. So come by our booth Sunday or Monday to get your coupon for a free cappuccino, compliments of Orca Watercare!

You can bring back your beverage to the **MIEX® Cafe** area at our booth, set aside for ACE attendees to chat and catch up on the latest MIEX® News. Coffee and tea will be served there Tuesday and Wednesday morning.

Tuesday afternoon from 3 to 5 pm, we'll be hosting a **Happy Hour** to recognize some key customers and provide attendees with an opportunity to mingle with current MIEX® Users.

Trade Shows Feature Pulp & Paper Applications

Presentations featuring the MIEX® Technology for pulp & paper wastewater recycling have been and will be featured at the following conferences: the APPITA Conference in New Zealand, April 20 - 23 and the Enviro '08 Conference to be held in Melbourne, VIC May 6.

Downstream Benefits of MIEX® Treatment

by Beth Pyles

Besides reduced formation of DBPs, there are many additional, measurable benefits to the use of MIEX® Pretreatment at a water treatment plant.

Coagulation Pretreatment

One of the most noticeable benefits for WTPs that use coagulation is the reduction in water treatment chemicals. With MIEX® Pretreatment, WTPs typically reduce the concentration of primary coagulants by 50 to 80 %. This equates to further advantages as noted below:

- Less alkalinity scavenged
- Less pH adjusting chemicals for neutralization
- Less corrosive water in the distribution system
- Less sludge production, and
- Less manpower to deal with sludge and chemical handling

Another strong benefit seen by utilities using MIEX® pretreatment followed by coagulation is the floc strength and speed of settling. Recently the AWWA Journal published an article by Jarvis et al (January 2008)¹, showing that the floc of MIEX® pretreated water settled almost 3 times faster than non-MIEX® treated water and required 50% less coagulant. The same work showed that MIEX® pretreated floc when sheered will reform faster and stronger than non-MIEX® treated floc.

The Green Valley WTP in CA will testify that they see:

- Lower settled water turbidity, which equates to;
- Less frequent filter backwashes.

Disinfection Pretreatment

Disinfection is another area that is greatly improved. Many utilities select MIEX® pretreatment in order to stay on or go back to free chlorine. This may allow the utility to apply chlorine back at the head of the WTP and avoid unsightly algae while gaining CxT credits. The utility will notice:

- Disinfectant dose reduced by 25-50%
- Residual remains in distribution system for a longer period of time
- Reduced HPCs in the distribution system
- Reduced likelihood for bacteriological outbreak, and
- Slower, less time dependent DBP increase in the distribution system

Membranes Pretreatment

Membrane filtration plants also benefit from MIEX® Pretreatment. MIEX® Treatment has been shown to do the following:

- Improve flux rate by 30%
- Reduce Trans Membrane Pressure (TMP) and hold TMP more stable
- Extend Membrane life
- Reduce frequency of Clean In Place (CIP), and
- Reduce membrane waste volumes by 50%.

GAC Pretreatment

MIEX® Pretreatment also greatly improves the life expectancy of Granular Activated Carbon (GAC). The greater the TOC demand of the water, the more costly GAC is to operate. MIEX® Treatment can extend the life of GAC exponentially, typically paying for itself over a life cycle.

DAF Pretreatment

MIEX® Treatment is also ideally suited to Dissolved Air Flotation (DAF).² MIEX® Pretreatment to DAF has been shown to:

- Increase the floc size by nearly 70%
- Increase the floc growth rate by nearly 25%
- Reduce the coagulant dose resulting in less floc loading on the DAF
- Increase air bubble to floc ratio, promoting more efficient floc flotation
- Improve floc strength, which will ultimately benefit DAF operation and performance
- Reduce filter loading and backwash frequency
- Increase throughput up to 60%
- Reduce skimming frequency by 75%
- Reduce treated water particle counts by 95%

Summary

In summary, MIEX® Pretreatment means:

- Significant cost savings in downstream treatment
- Improved water quality overall
- Increased plant capacity
- Reduced plant footprint
- Lower plant waste volumes
- Less maintenance and improved productivity

The cost savings and improved efficiencies that result from using MIEX® Treatment ahead of coagulation, disinfection, membranes, GAC and/or DAF make it an ideal pretreatment addition for any water treatment plant.

Article Resources

¹ *Treatment options and their effect on NOM*, Jarvis et al, AWWA Journal, January 2008

² *Impact of magnetic ion exchange (MIEX) resin on floc properties*, Jarvis et al, WQTC '07