ORICA WATERCARE

MIEX®PRESS

What's Inside

Letter from the Editor

We have an exciting mix of international news in this August edition of MIEX®PRESS—from the certification of MIEX® Resin for drinking water applications in Japan to the start-up of the first MIEX® Installation in the UK at Yorkshire Water's Albert Water Treatment Works.

The first installation in the New England region of the U.S. was recently commissioned at Newport, ME. This is the first MIEX® System to continuously use sodium bicarbonate for regeneration. Also find inside a technical article that covers the use of membranes to recycle MIEX® Process waste for up to a 75% reduction in waste volumes.

Our trade show schedule is included along with a recap of ACE09 in San Diego where the Village of Palm Springs, FL competed in AWWA's National Best of Best Taste Test Contest. If you have any questions about the featured articles, please don't hesitate to contact me.

Best Regards

Stephanie Schnider

Stephanie Schnider
www.miexresin.com

First MIEX® System in New England Commissioned in Late June

The first MIEX® System in the New England region of the United States commenced operation in Newport, ME late June 2009. This is the first MIEX® System in the U.S. to continuously operate with sodium bicarbonate regeneration.

The Newport Water Plant is a traditional slow sand filtration plant that pulls from a low turbidity and low alkalinity pond. Chemical additives used at the water plant included caustic soda, hydrofluosilicic acid and sodium hypochlorite solutions.

Being a small system, the district was required to comply with the Stage 1 D/DBP Rule in January 2004. The first quarter of 2004 did not bring acceptable DBP levels but instead resulted in HAA5s in excess of 80 µg/L. Operations staff attempted to optimize finished water chemistry but both Trihalomethane (THM) and Haloacetic Acid (HAA5) running averages continued to trend above their respective Maximum Contaminant Levels. By the end of 2004 it was apparent that a significant capital improvement

Figure 1: MIEX® System at the Newport, Maine Water Treatment Plant

project would be necessary to successfully comply with the Safe Drinking Water Act.

(See Newport System on Page 2)

Hi-Tech Way to Supply Clean Water

Article released by the UK Halifax Evening Courier June 22, 2009

Groundbreaking water treatment technology is being introduced in Halifax, West Yorkshire. Yorkshire Water is using Magnetic Ion Exchange (MIEX) technology to provide 60 million litres of clean water to people living in Halifax and the Calder Valley every day.

Albert Water Treatment Works opened in 1988 and is one of the more than 700 water and sewage works that Yorkshire Water operates in the region.

Alan Bennett, solutions manager at Yorkshire Water, said: "The introduction of MIEX® Technology at the treatment works marks an innovation milestone in the UK water industry and will support us in our ongoing mission to continue to provide customers with some of the best quality drinking water in the world."

"Yorkshire Water is the first company in Europe to introduce this ground-breaking technology at this scale, further highlighting our commitment to constantly look for ways of improving our systems and improving the service we offer.

"Albert Works has always received coloured raw water as a result of much of it having travelled through moorland areas to arrive at reservoirs where it is sourced from."

Yorkshire Water is also introducing MIEX® Systems into two more of its works at Ewden, near Sheffield and Graincliffe, near Bingley, with both systems expected to be up and running by March 2010.

Figure 2: MIEX® System at Yorkshire Water

Newport System

(Continued from Page 1)

The MIEX® Technology was first considered in 2005 when Thomas Todd, Newport Water District General Manager, visited a MIEX® pilot being operated in Massachusetts. At the time, Tom had thoughts of installing membrane filtration with a small amount of coagulant for removing Total Organic Carbon (TOC). Pilot testing indicated however that enhanced coagulation would not decrease TOC sufficiently to maintain long-term compliance with the Stage 1 D/DBP Rule.

In 2007 the district, in consultation its engineer Wright-Pierce, decided to evaluate biologically active granular activated carbon (BAC) head to head with the MIEX® Process. The pilot was conducted in late September 2007. At the time, raw water and finished water TOC levels averaged about 5.0 mg/L and 3.5 mg/L respectively.

With the MIEX® Process, average TOC levels were reduced to below 1.5 mg/L—a 73% reduction on average—while BAC was only able to reduce the TOC levels by 53%. As a result, it was determined that the MIEX® Process would enable the Newport Water District to comply with both the Stage 1 and 2 D/DBP Rule at lower capital and operating costs.

Sodium chloride is typically used to regenerate the MIEX® Resin. The resulting brine waste can then be discharged to the local sewer . However, this disposal option was not available to the Newport Water Plant and the cost to haul the brine waste for off-site disposal was prohibitive. As a solution to this issue, Orica Watercare along with Wright Pierce determined that sodium bicarbonate could be used as an alternative regenerant solution to regenerate the resin. The cost of handling and disposing a sodium bicarbonate solution with natural dissolved organic matter on-site was determined to be far lower than the cost of hauling brine waste off-site for disposal.

"Creativity is required to help smaller communities design water treatment systems that work for their facilities – systems that provide the best method to achieve the highest water quality and meet new regulations," stated Jeff Musich, P.E., Vice President of Wright-Pierce. "We are thrilled to be selected to design and construct this state-of-the-art water treatment facility. The district's water quality will meet stringent federal and state requirements, and consumers should notice improved taste and reduced color."

The 420 gpm MIEX® System was commissioned in late June 2009. Water quality data measured shortly after start-up showed DOC & True Color average reductions at 76% & 86% respectively, which is in-line with expectations and pilot results.

Orica is represented by Technology Sales, 978-838-9998, in the New England Territory.

North American Sales Representation

Orica has a comprehensive external sales network in North America that extends as far north as Alaska and as far south as Puerto Rico. To contact a rep in your area, click on either map or visit our website for a full listing.

Figure 3: Map of U.S. Sales Representation

Figure 4: Map of Canada Sales Representation

ACE09 Recap

Figure 5: Don Ray & Bill Davis (above) represented the Village of Palm Springs at the ACE09 Best of Best Taste Test

This year's Annual AWWA Conference in San Diego provided the perfect platform for some very exciting MIEX® happenings – from a nail-biting taste test contest to a happy hour with customers representing the first MIEX® Installation in the U.S. at the Village of Palm Springs, FL and the largest MIEX® Installation in the U.S. at St. Cloud, FL.

After winning the statewide taste contest in Florida, the Village of Palm Springs participated in AWWA's "Best of the Best" taste test at ACE09 in San Diego. While they didn't leave with the national title, they did finish within the top 5 in the country, which is a very impressive feat. Congratulations to the Village of Palms Springs!

MIEX® Resin Certified for Use for Drinking Water Treatment in Japan

Maezawa Inc, Orica's MIEX® Technology representative in Japan, has worked closely with Japanese Authorities including the Japan Water Research Centre (JWRC) to have the MIEX® Resin and Process certified as safe for use in Drinking Water treatment.

Certification was obtained after a thorough examination by Japanese authorities according to a recently implemented formal process developed by the JWRC.

The MIEX® Technology is the first technology to successfully achieve certification under the new process. Obtaining Certification was an important step in Maezawa's introduction of the MIEX® Technology in Japan.

"We are very excited to have obtained certification in Japan and believe that this opens up a very promising market for the MIEX® Technology in East Asia," stated Rob van Merkestein, Regional Manager for Orica Watercare's MIEX® Business in China.

Maezawa is a leading Japanese water engineering company with a long history of delivering successful water infrastructure projects in Japan and abroad. Maezawa is actively validating the performance of the MIEX® Technology at pilot scale for Japan water authorities. Results from these activities demonstrate significant water quality and treatment process efficiency will be realized by the adoption of MIEX® at full scale.

Figure 6: JWRC Certificate

UpcomingTrade Shows

AL/MS AWWA	October 4-8	Orica Watercare Booth
CA/NV AWWA	October 5-8	Orica Watercare Booth
WEFTEC	October 10-14	Presenting Paper
NC AWWA-WEA	November 15-18	Presenting Paper
WQTC	November 15-19	Orica Watercare Booth

Membrane Recycling of MIEX® Process Waste

Waste Volumes Reduced by Over 75%

Filtration processes using high pressure membranes such as Reverse Osmosis (RO) and Nanofiltration (NF) have been successfully used to remove relatively low concentrations of TOC, sulphate and hardness from drinking water sources but have rarely been used to remove higher concentration of these constituents from waste streams. If TOC and sulphate are removed from waste brine produced by the MIEX® Process, the 'cleaned' brine can be recycled for resin regeneration, making the MIEX® Process a much more sustainable alternative for TOC removal applications.

Several trials have been conducted at different full-scale MIEX® Installations and have demonstrated the ability to recycle waste brine via a process that utilizes nanofiltration membranes to filter out over 98% of the TOC and sulfate. This recycling process can recover up to 80% of the waste brine for further regeneration while significantly reducing the amount of replacement salt required for the MIEX® Process by up to 50%.

Specifically sized NF membranes reject the organic material and sulfate from the waste regeneration solution while allowing sodium chloride to pass through, resulting in a concentrated organic reject stream and a clear permeate brine stream (Figure 7).

While cleaning frequencies are greater than typical potable water treatment applications, this is not a concern as the size of the membrane system required for waste treatment is so small, i.e. for a typical 30 MGD MIEX® System the capacity of a membrane system to treat all of this waste would be less than 10 gpm.

Figure 7: Initial Feed (Left), Concentrate (middle) and Permeate (Right)

A trial at a full-scale MIEX® Installation in Florida (Figure 8) demonstrated that the treatment of waste brine produced from this water source can reduce the volume of waste requiring sewer disposal by around 80% to 60 gal waste per million gallons of water treated. In addition to reducing the waste volume, the ability to recycle the permeate for resin regeneration will reduce the amount of salt required for resin regeneration by up to 50%.

Operational Considerations

The NF waste treatment system requires minimal operator attention and is best

Figure 8: NF Unit Treating Waste from a full-scale MIEX® System in Florida

operated in a batch mode. The permeate NaCl concentration is a little more dilute than is typically used to regenerate MIEX® Resin, so a portion of the permeate must be re-saturated prior to reuse in the MIEX® Process regeneration system. Operating costs for membrane replacement, power and cleaning are less than US$10 per million gallons of MIEX® System throughput.

Conclusions

- With waste brine recycling it is possible to reduce the volume of waste produced by the MIEX® Process by up to 80%, which will significantly reduce waste disposal costs.
- Recycling waste back into the regeneration process will reduce the amount of salt consumed in resin regeneration by up to 50%.
- The ability to recycle up to 80% of waste brine significantly enhances the sustainability of the MIEX® Process in TOC removal applications.

Papers to Discuss MIEX® Technology at AWWA WQTC, Nov. 15-18

WED2 Session: Alternative Strategies to Manage DBPs

11:30 am – Using MIEX® Resin & Membrane Filtration to Treat a Challenging Source Water in a Fort McMurray, AB Work Camp
Christina Fonseca, Stantec Consulting, Ltd.

TUE17 High Pressure Membranes: Organics Removal, Desalination, & Concentrate Mgmt

4:00 pm – Zero Liquid Discharge Desalination, Results from Two Water Research Foundation Projects
Rick Bond, Black & Veatch

TUE4: DBP Poster Session

Removal Natural Organic Matter and Hardness by Combined Ion Exchange
Jennifer Apell, University of Florida