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Letter from the editor

Hello all and welcome to the August edition of MIEX[®]PRESS.

What a busy spring and summer we've had this year! Since the beginning of the year, 6 new MIEX[®] Plants have been commissioned in the U.S. alone. By the end of this year, an additional 4 installations will be commissioned across the globe in the U.S., New Zealand, and England.

Along with the growing number of MIEX[®] Systems worldwide, interest in bench testing and piloting continues to spread into new geographical regions. Of particular interest are several pilots taking place in China, where Orica Watercare will be opening a new office in September.

Read on for more exciting MIEX[®] News. And feel free to contact me with any questions about the following articles.

Best Regards,



Stephanie Schneider
www.miexresin.com

7.5 MGD MIEX[®] System Commissioned at Portsmouth, Ohio



Figure 1: Settling vessel at Portsmouth, Ohio MIEX[®] Installation

The City of Portsmouth's 15.5 MGD water treatment plant started producing water through its 7.5 MGD MIEX[®] Treatment system July 16, 2008. Project design was a team effort completed by Brent Tippey at HDR/Quest Engineers and Doug Hammann of Eckler Engineering. The concrete system was installed by P.A.E. and Associates of Brookville, Ohio.

The Portsmouth WTP treats Ohio River water with conventional

coagulation, sedimentation and filtration. The WTP installed in 1950 had not seen a significant plant improvement since doubling its capacity in 1972 until the installation of the MIEX[®] System. The MIEX[®] System will allow the plant to finally meet the Stage 1 TOC treatment removal technique, and will allow for compliance with the Stage 2 DBPR while reducing the amount of alum used to coagulate the water.

Significant Downstream Benefits Seen After Start-up at Burr Oak, OH

Ohio's first operating MIEX® System was commissioned in April at the Burr Oak Regional Water District (BORWD) in Glouster, Ohio.

Engineering project management for installation of the system was by Alan Brown P.E. of ME Companies in New Lexington, OH.

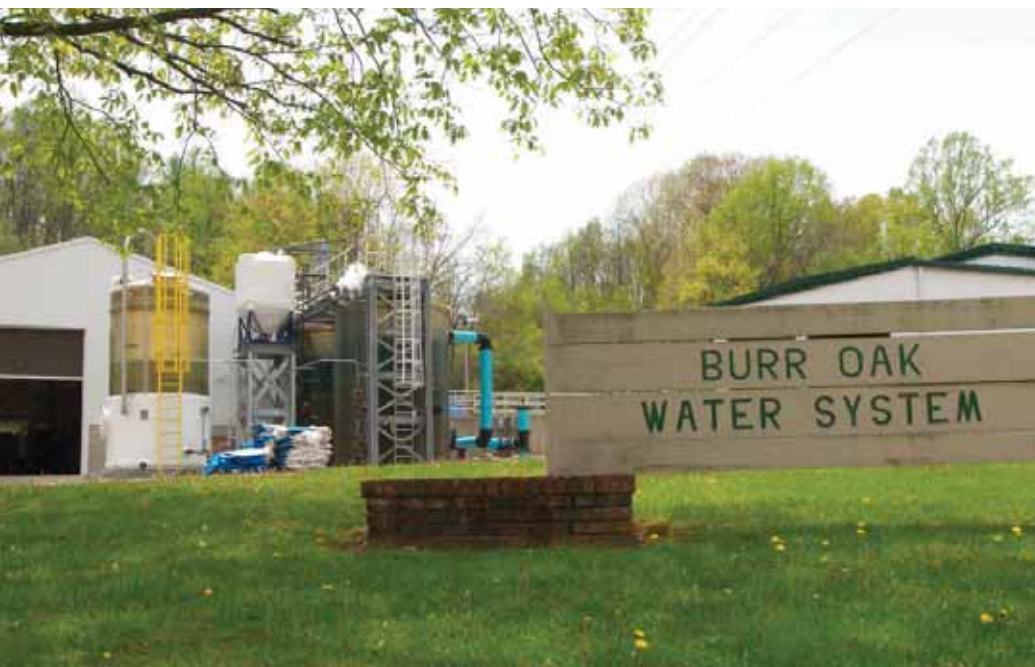
The BORWD water treatment plant sources its raw water from nearby Burr Oak Reservoir. Prior to installation of the 2.4 MGD High Rate MIEX® System, treatment consisted of conventional coagulation with alum, sedimentation and multi-media filtration. Raw water TOC levels are in the range of 2.7 to 4.4 mg/L and the conventional treatment process reduced this by an average of 40%. Raw water was dosed with potassium permanganate in an

attempt to improve TOC removal after coagulation and minimize the subsequent formation of disinfection byproducts (DBPs) after disinfection. In addition to chlorination at the water treatment plant, six of BORWD's satellite customers have chlorination booster stations to maintain an adequate residual through their distribution systems.

While the primary objective of installing the MIEX® System was to reduce TTHM levels, a number of additional downstream benefits were observed shortly after start-up. The

(See Burr Oak on Page 4)

Figure 2: Water treatment facility in Burr Oak, Ohio with MIEX® System in background.



New Office in Beijing, China

Following the signing of a collaboration agreement by Orica Managing Director, Graeme Liebelt and China Water's chairman, Mr. Wang Wanke in November 2007 (See December 2007 MIEX®PRESS issue), Orica Watercare has announced it will open an office in Beijing in September 2008. Rob van Merkestein, previously Regional Manager - MIEX® Asia Pacific & Africa based in Melbourne, has taken on the role of Regional Manager for the MIEX® Business in China and has relocated to Beijing. Pilot trials are already underway at three sites in China.



Potable Water for Remote Communities

The growing natural resources market has increased demand for producing potable water at remote communities such as mines or exploration sites. Orica Watercare's experience in implementing packaged MAGNAPAK® Systems for potable water treatment at municipal sites lends itself to address this need for industrial end users.

In particular, energy companies conducting operations in the oil sands of Canada are expanding and/or developing new sites and are responsible for providing potable water to these sites. The MIEX® Process offers a cost-effective and reliable option for removing DBP precursors and color from water supplies at these remote sites.

The North American MIEX® Team at ACE08 in Atlanta, GA



Trade Show Schedule, Fall 2008

Cranfield University Conf	September 2-4	Orica Watercare Booth
Rocky Mountain	September 14-16	Shared Booth with Hydrologx
Ohio AWWA	September 17	Shared Booth with Smith Environmental
Western Canada	September 23-24	Shared Booth with Mequipco
Amsterdam Aquatech	Sept. 30 - Oct. 3	Orica Watercare Booth
AL/MS AWWA	October 5-7	Shared Booth with Eco-Tech
OK AWWA	October 13-14	Shared Booth with Hartwell
CA/NV AWWA	October 21-22	Orica Watercare Booth
International Water Conf	October 26-28	Orica Watercare Booth
HI AWWA	October 29-30	Presenting Paper
WQTC 08	November 11-15	Orica Watercare Booth
NC AWWA-WEA	November 16-18	Shared Booth with Heyward
FL AWWA	Nov. 30 - Dec. 4	Shared Booth with Moss Kelley

Johnston County to Install North Carolina's First MIEX® System

The Johnston County Board of Commissioners recently approved the installation of a MIEX® pre-treatment system at its 14 MGD Water Treatment Plant to meet tightening EPA standards for disinfection by-products.

JOHNSTON COUNTY, NC -- The MIEX® Process uses a magnetized ion exchange resin to remove natural organic matter from water supplies,

a precursor to the formation of disinfection by-products (DBPs). The selection of this treatment process followed an extensive study conducted during 2007 and early 2008 by the County's engineering consultant Hazen and Sawyer. The Johnston County system serves an ever-growing community with a distribution system residence time of twelve to fifteen days. "With the water age and the propensity to form DBPs as well as nitrification,

MIEX® [Treatment] allows the plant to switch back from chloramines to free chlorine," says Hazen and Sawyer Senior Assistance Associate Gary Iverson. "It was determined that ion exchange and carbon adsorption would both provide the required precursor removal and of these the MIEX® Ion Exchange Process was the most cost effective," said Iverson. This will be the nineteenth MIEX® System to start up in the United States and the first in North Carolina.

Pilot evaluation of MIEX[®] and Coagulation Pretreatment on Membrane Performance at Opelika, Alabama

Opelika Utilities operates two water treatment plants: the 16 MGD Betts and the 8 MGD Saugahatchee Lake facilities. Trials were conducted to determine the optimal pretreatment for membranes proposed for these facilities so that treated effluent could achieve the best possible water quality, ensuring compliance with current and future regulations.

A pilot-scale comparison of membrane filtration pretreated with coagulation with and without MIEX[®] Pretreatment for TOC removal was conducted at Opelika, Alabama using the Saugahatchee Lake Reservoir Source. The duration of the study was from October 2007 until April 2008 and evaluated both normal operation and worst-case source water conditions, which included lowering the raw water intake to the reservoir bottom. The membrane that was utilized for the study was a Pall Microza[®]

Microfiltration UNA-620A hollow-fiber that was operated in a direct filtration mode with in-line pretreatment. Different dosing conditions were optimized and implemented to deliver the best possible water quality to the membrane unit for at least 5 day periods while trans-membrane pressure (TMP) increases were monitored. The objectives of this trial were to remove the maximum amount of raw water TOC whilst minimizing membrane fouling.

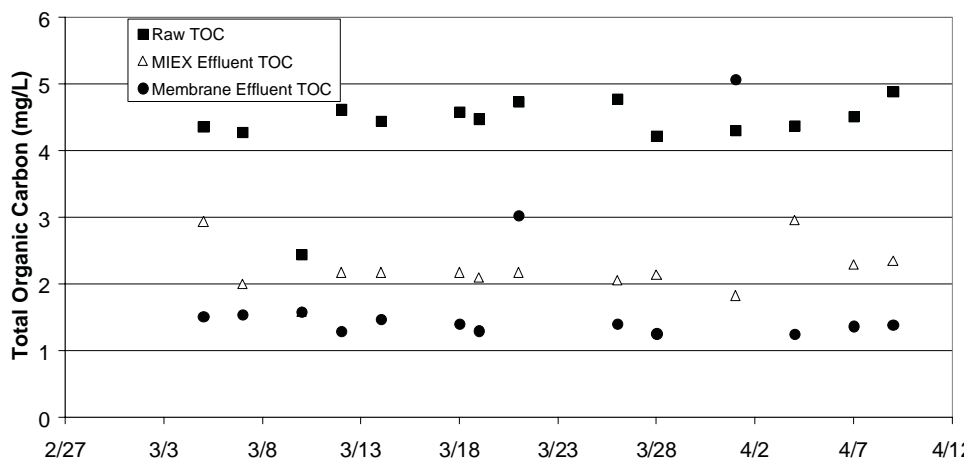
The coagulant selected for the study was aluminum sulfate (alum) at an optimal dose of 20 mg/L dosed in a direct filtration configuration. The TOC removal using alum was on average 30%, which lowered the raw water TOC from 4.36 mg/L to 3.05 mg/L. This dose resulted in TMP increases of 3 psid per day during membrane operation. Daily enhanced flux maintenance (EFM) cleans with

chlorine washes at 500 mg/L and 95°C were conducted during the trial which resulted in a total increase in TMP from 5 to 12 psid for the 5-day duration of this pretreatment.

Using the MIEX[®] Process followed by coagulation allowed a reduction of the alum dose to 15 mg/L. TOC levels were reduced by the ion exchange and coagulation by 60% on average (raw water TOC from 4.36 mg/L to 1.74 mg/L as shown in Figure 3). This pretreatment scenario saw less of a TMP increase, 1 psid per day during membrane operation, with an overall increase of 5 to 9 psid for the 11-day duration. Daily EFM chlorine washes were also performed under the same conditions as the trial solely using coagulant.

Overall the recovery of the Pall[®] unit was independent of pretreatment and always achieved a flux of 50 GFD with a 95.9% recovery and effluent turbidities of 0.014 NTU. Based on the data gathered for the coagulant testing with and without MIEX[®] Pretreatment a clean in place (CIP) interval of greater than 30 days is possible, although this time would be increased significantly with MIEX[®] and coagulation pretreatment due to a lower organic and solids (floc) loading on the membranes. The chemical cleaning processes that were used (sodium hydroxide, citric acid and chlorine) demonstrated the ability to consistently restore membrane permeability for all pretreatment scenarios.

Figure 3: TOC removal achieved using the MIEX[®] Process, in-line coagulation and membrane filtration



Burr Oak

(As continued from Page 1)

significant reduction in coagulant demand that was seen in the initial bench scale study was also achieved downstream of the full-scale MIEX[®] System with the alum dose being reduced from 35 to 8 mg/L. The plant operators were also able to turn off the liquid sodium permanganate, which was no longer required to improve DBP precursor removal through the plant. The operators have seen improved floc settleability and a subsequent 50% reduction in turbidity levels onto the filters, which is consistent with findings from other studies (Jarvis, 2008) where floc size and settling rates are increased after MIEX[®] Pretreatment. BORWD District Manager, Willard Stanly, commented, "the clarifier looked clearer than he has ever seen it."

The lower treated water DOC level has significantly reduced the chlorine demand in the distribution system,



Figure 4: Raw water is first treated by the MIEX[®] Process (front left) then flows to downstream coagulation and clarification (rear).

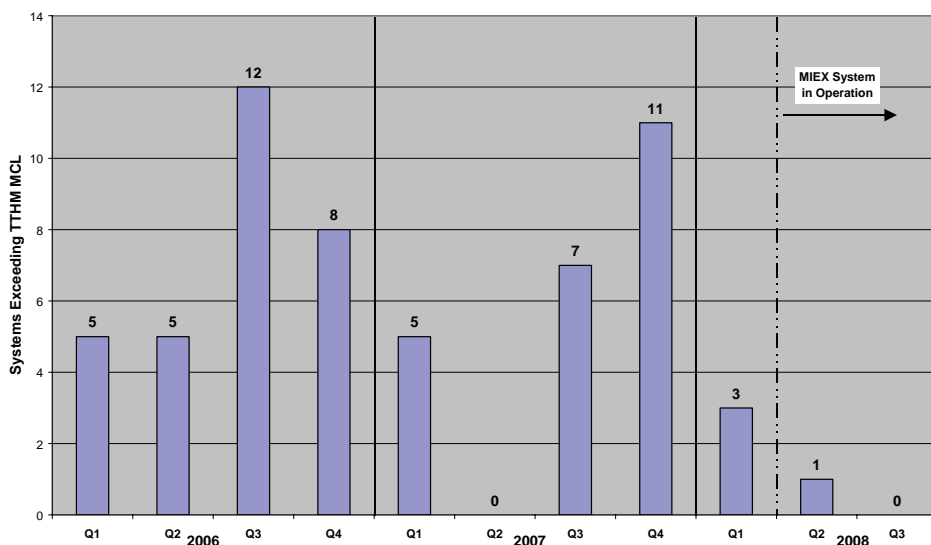
which has allowed all six chlorination booster stations be turned off while the Burr Oak WTP operators are also slowly reducing the primary chlorine dose at the plant. With a much more stable chlorine residual, some remote parts of the distribution system are now detecting a chlorine residual for the first time.

Since start up of the MIEX[®] System the reduced levels of DBP precursors

and the subsequent lower chlorine demand of the treated water has resulted in an average reduction in quarterly TTHM levels of 36% across all systems served by the BORWD compared to the corresponding quarters in 2007. This has resulted in TTHM levels for all systems being below the EPA MCL in the third quarter of 2008 compared to seven systems exceeding the MCL in 2007 and twelve systems in 2006 (Figure 5).

This is the first of three MIEX[®] Installations to start up in Ohio during 2008. A 7.5 MGD system at the City of Portsmouth was started up in July (see article in this Newsletter) and a 4 MGD MIEX[®] System at the City of Napoleon is due to start-up in September 2008.

Figure 5: Burr Oak satellite systems exceeding the TTHM MCL for a single quarterly sample.



Article Resource

- 1 Jarvis, P.; Jefferson, B.; Dixon, D.; & Parsons, S., 2008. Treatment Options and Their Effect on NOM-Coagulant Floc Structures. Journal AWWA, January 2008.