

Case Study

Desoto Water Works District #1 Water Treatment Plant

IXOM
WATERCARE

Client

DeSoto Waterworks District #1

Project

1 MGD MIEX® High Rate System

Location and Date

DeSoto Parish, LA November 2018

Engineers

Manchac Consulting Group Inc.



"We have achieved twice the chlorine residuals and lowered our DBPs using half of the chlorine dosage compared to prior to pretreating with MIEX."

John Neilson
Administrator
DeSoto Parish WaterWorks #1

Challenge

When the state of Louisiana enacted the Emergency Disinfection Rule in response to the *Naegleria fowleri* parasite on November 6, 2013, the disinfection residual was increased from 0.2 to 0.5 mg/L at the terminal part of the distribution system. This provided a tremendous challenge to WTPs that were already struggling to meet Stage 2 Disinfection By-Products regulations and which were already using chloramines.

DeSoto Parish had personally witnessed the ravishing affects of the parasite, and also struggled to meet Stage 2 DBPs while using ammonia. The raw water for the DeSoto Parish Water Works District #1 (the "District") is a shallow reservoir with a TOC of around 10 mg/L, and for which alum coagulation ranged in effectiveness from 35% - 70% depending on the season.

Iron and Manganese issues could become significant with a few hours notice, and the District had already invested in membrane filtration, and spent sizeable amounts of money on chlorine dioxide, caustic, and ammonia in an effort to provide it's citizens with the best drinking water possible.

Solution

The District became convinced that the best way to avoid many of the pitfalls of chloramination - nitrification, poor tasting and smelling water, and the growth of *Naegleria fowleri* - was to convert back to free chlorine. The challenge was how to reduce the organics even further, such that free chlorine could be used without violating Stage 2 Disinfection By-Products regulations. The District began testing MIEX resin pretreatment in 2015, to see what impact it could have on overall TOC reductions.

MIEX®



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DeSoto Parish DBPs: December 2018

Sample Location	TTHM (µg/L)	HAA (µg/L)
IXOM Tap	<0.32	<0.9
Membrane Tap	-	-
Keachi	31.1	41.9
Sleepy Hollow	42.4	50.3
Jennie Lp	37.6	42.9
Plant Effluent	16.4	20.3

DBP Sample from 12/20/18. Free Chlorine conversion occurring.
Residuals >2.0 mg/L.

MIEX Pre-Treatment: "High Rating" a Floc/Sed Basin

DeSoto Parish has seen an increase in water demand which had outpaced their flocculation / sedimentation basins. The result of this was a large volume of solids that regularly escaped the sedimentation basins, and landed on the surface of their membrane filters. While the membranes were able to handle the load, the result was continuous backwashing of the membranes, and a cleaning regime that was onerous. Due to MIEX pre-treatment, the floc saw many improvements including its size, structure, and ability to settle out in the existing sedimentation basins at the flow required by the utility. In effect, the MIEX pretreatment allowed them to "high rate" their existing floc/sed process and resulted in longer membrane run time and fewer cleanings.

Project Outcome

Depending on the season, MIEX pretreatment can offer as much as 35% additional DOC reduction when compared to chlorine dioxide / alum / caustic. Prior to MIEX pretreatment, the alum doses at the District were between 150 - 220 mg/L, with chlorine dioxide doses in summer of up to 8 mg/L, caustic all year, as well as chlorine and ammonia. Chemicals costs were high. After MIEX, the alum dose has been reduced by 50%, no chlorine dioxide is utilized, and ammonia has been turned off. Free chlorine is reaching parts of the distribution system which haven't seen free chlorine in years. The District is still reducing chlorine levels entering the distribution system as the demand continues to lower, and first quarter DBPs samples show compliance even while residuals levels are much higher than required.



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