



BACKGROUND

United Water Matchaponix (UWM) is a 5.0-MGD surface water treatment plant located in Manalapan, NJ, that supplies drinking water to 5 bulk customers. The facility employs conventional treatment through coagulation, flocculation, sedimentation and filtration. As with most surface water treatment plants, the EPA's adoption of the Interim Enhanced Surface Water Treatment Rule (IESWTR) and Disinfection By-Product Rule (D/DBPR) have had a profound impact on the regulatory compliance. In the past three years, UWM has made strides to comply with these more stringent regulations utilizing its existing infrastructure. An integral part of their program has been the inclusion of CAIROX® potassium permanganate for pre-oxidation along with changes in the application point of the treatment chemicals.

CAIROX EVALUATION

The following is a summary of the steps that UWM has taken to consistently comply with the IESWTR & D/DBPR.

Phase 1: The pre-chlorine injection point was moved from before filtration to directly after filtration. With that change in place, a 15% reduction in hypochlorite demand was realized while still maintaining the same chlorine residual (an immediate expense savings). That change attributed to a 4-quarter rolling average reduction from about 70 ug/l to about 50 ug/L, a 28% reduction in the THM rolling average and an immediate cost savings.

Phase 2: The treatment facility has an injection vault prior to the static mixer where all of the treatment chemicals (CAIROX, Powdered Activated Carbon (PAC), lime, coagulant) except hypochlorite are injected. At the beginning of the third quarter of 2000, PAC was moved to the effluent of the primary settling basin. This allowed about 4 hours for the permanganate to react before encountering the PAC. With this change, CAIROX and PAC were both more effective in removing precursors from the water. The data shown in Figure 1 indicates that this process resulted in a 44 to 75% reduction in THM levels.

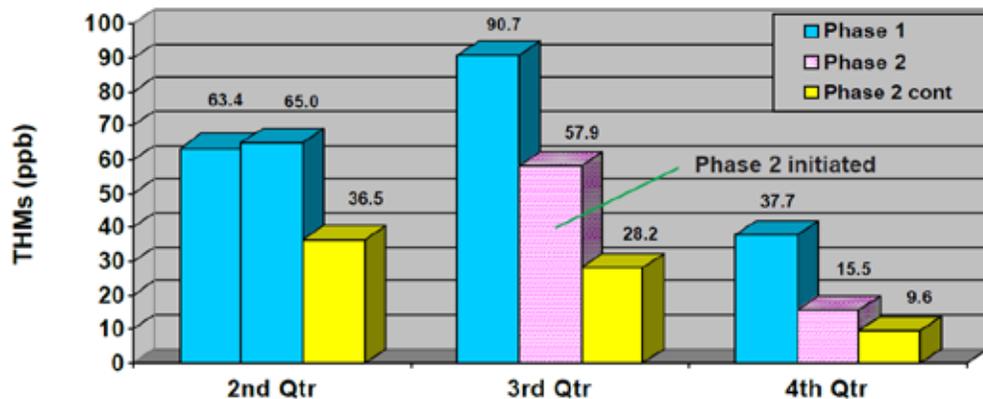


Figure 1:
Phase 1: Moving Cl₂ after the filters
Phase 2: Separating CAIROX® and PAC



CONCLUSIONS & OBSERVATIONS

- ✓ Moving prechlorination to after the filter reduced THMs by 28% and lowered operating costs.
- ✓ Adding CAIROX potassium permanganate before PAC resulted in an additional 44 to 75% reduction in THMs.
- ✓ CAIROX potassium permanganate and coagulation improved organic removal.
- ✓ The efficiency of the PAC for organics removal was improved.

CARUS VALUE ADDED

LABORATORY SUPPORT

Carus has technical assistance available to answer questions, evaluate treatment alternatives, and perform laboratory testing. Our laboratory capabilities include; treatability studies, feasibility studies, and analytical services.

FIELD SERVICES

As an integral part of our technical support, Carus provides extensive on-site treatment assistance. We offer full application services, including technical expertise, supervision, testing, and feed equipment design and installation in order to accomplish a successful evaluation and/or application.

ENGINEERED SYSTEMS AND EQUIPMENT SERVICES

Standard feeders are designed specifically for CAIROX. Various options and accessories are available to meet a wide range of applications. Carus offers custom-engineered feed systems, pre-engineered and prepackaged systems through an equipment partner. They provide efficient, dust-free methods of storing, mixing, and feeding CAIROX. System designs are customized to meet specific applications and customer needs.

REFERENCES

Ma, J., Herbert, D. Using Potassium Permanganate as a Pre-Oxidant to Reduce Disinfection By-Products, Presented at AWWA California WEA, Fall 2000.

Roth, J. G., Ozment, C.L., Stage 2 HAA Treatment Techniques, On-Line Trials and Costs, Presented at the Illinois Potable Water Supply Operator Association, Sept. 2000.

Ma, J., Graham, N., Controlling the Formation of Chloroform by Permanganate Pre-oxidation-Destruction of Precursors, *J Water SRT-Aqua*, Vol.45, No.6, (1996)

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Permanganate products are not registered as a pesticide under the Federal Insecticide, Fungicide and Rodenticide Act administered by U.S. EPA or similar state laws. Use as a pesticide is not government approved.