

Green Valley Water Treatment Plant

Client

Green Valley Water Treatment Plant

Project

TTHM Reduction

Location

Suisun, CA

Commission Date

January 2006



Figure 1: MIEX® Installation (foreground) at the Green Valley WTP

“We are relieved to be back in compliance with the Stage 1 Disinfection By-Product Standard so quickly. Also, the comfort margin will allow us to easily meet the Stage 2 requirements.”

Franz Nestlerode, Deputy Water Superintendent.

Project Summary

The Green Valley Water Treatment Plant (WTP) draws its water from two sources to supply Suisun, CA and surrounding communities. The WTP's distribution system is very long resulting in lengthy detention times where free chlorine used for disinfection reacts with total organic carbon (TOC) to form high levels of Total Trihalomethanes (TTHMs). The Green Valley WTP was unable to adequately reduce the source water TOC levels to achieve compliance with the Environmental Protection Agency (EPA) TTHM regulations.

A MIEX® Treatment System was installed in January 2006 to reduce the treated water TOC level prior to disinfection. This resulted in over a 65% decrease in distribution system TTHM levels, allowing the Green Valley WTP to easily meet the EPA TTHM standard.

Challenge

The Green Valley WTP operated by the City of Vallejo, sources raw water from Lakes Frey and Madigan, and the Solano Irrigation District supplied from Lake Berryessa.

The WTP's long distribution system includes a 9-mile long, 24-inch main that serves only 62 connections. As a result, distribution detention times range from two weeks to as long as four weeks, thus providing more time for the chlorine to react with TOC and form TTHMs.

The plant's previous coagulation treatment using alum and a cationic polymer had little impact on treated water TOC levels for either water source. The WTP was therefore unable to reduce TTHMs to below the EPA standard.

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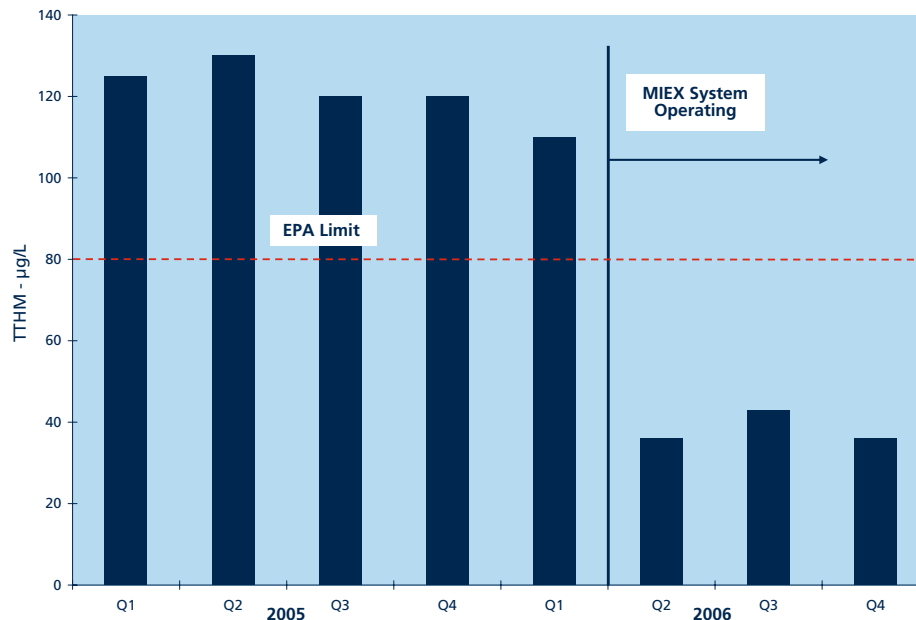
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Figure 2: System Wide TTHM Averages



Solution

The City of Vallejo considered several technologies to address the TTHM problem at the Green Valley WTP, including the MIEX[®] Process, Granular Activated Carbon (GAC) and enhanced coagulation. Based on capital and operating costs the net present worth of GAC was significantly higher than the alternatives. Enhanced coagulation was not effective in providing enough TOC removal to reduce TTHMs below the EPA standard.

In May 2004, a MIEX[®] Pilot was conducted which indicated that TOC levels could be significantly reduced, providing a large comfort margin for the WTP to meet current and future EPA TTHM standards.

As a result the City of Vallejo decided to install a 1 million gallon day (MGD) MIEX[®] treatment system as a pretreatment step to the existing treatment plant.

Project Outcomes

- Full-scale treatment results mirrored pilot trial results for TOC removal and Simulated Distribution System TTHM reductions.
- Treated water TOC levels have been reduced by 60 to 70%.
- System wide average TTHM levels have been reduced from 119 µg/L to 38 µg/L after MIEX[®] System start-up.
- Coagulants (alum and polymer) have been replaced by an ACH/polymer blend at less than 10% of the previous dose rate.
- Chlorine dose for disinfection has been reduced by 40%.
- Algae growth has been significantly reduced in downstream treatment processes.
- Chlorine residuals can now be achieved at the furthest points of the distribution system.