

Case Study

Somersworth, NH

KRÜGER



The City of Somersworth Plant

Plant Highlights

General information

Project Location: Somersworth, NH
Client: City of Somersworth
Design Engineer: Wright-Pierce
Operational Since: Summer 2007

Challenge

Improve TOC removal rates, improve disinfection regime to meet Stage 1 & 2 DBP (TTHM & HAA5), increase plant capacity from 3 MGD to 6 MGD and maintain existing building footprint and historical value.

Solution

Clarification and filtration upgrades to provide a total treatment capacity of 6 MGD.

Conclusion

Two, 3 MGD trains of Kruger's ACTIFLO® high rate clarification process were installed for enhanced total organic carbon (TOC) removals along with additional filtration capacity.

The Challenge

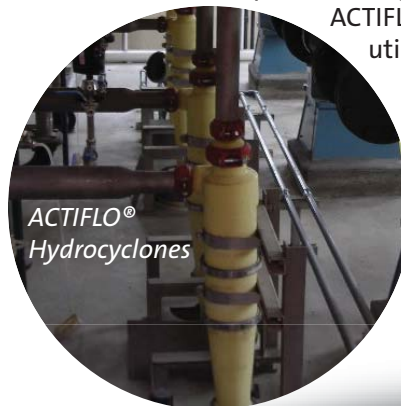
The City of Somersworth has a historical background dating back to the early 1900s when it became the first community to start using chlorine to disinfect its drinking water. The city worked with Wright-Pierce Engineers to preserve the historic value of the buildings at the Somersworth plant while improving both TOC removal rates and the plants disinfection regime. The ACTIFLO® technology had to be integrated into an 1895 plant environment while maintaining existing operations during construction and upgrading the plant from a 3 MGD flow to a 6 MGD flow.

Plant Overview

In 1971 a 1 million gallons per day filter system was created and used until 1991. The Somersworth plant then experienced a second upgrade that included a single train up flow clarifier. The 1991 plant design capacity was 3 MGD to help with the city's growth demands but the existing finish water high lift pumps limited pumping capacity at 1.4 MGD.

In 2001, the Somersworth plant went through another plant upgrade to include increasing the finished water pump capacity to 3 MGD and to integrate a plant wide SCADA system.

In an effort to screen new clarification processes, pilot testing was conducted in the fall of 2004. The decision was made to use Kruger's ACTIFLO® microsand ballasted clarification process based on pilot testing results, process footprint, ACTIFLO® installation base and utilization of existing buildings.



A phased construction plan began in 2006 that included clarification, filtration, disinfection and sludge handling upgrades all while maintaining 3 MGD of existing facility operations.



Solutions & Technologies

Process Solution

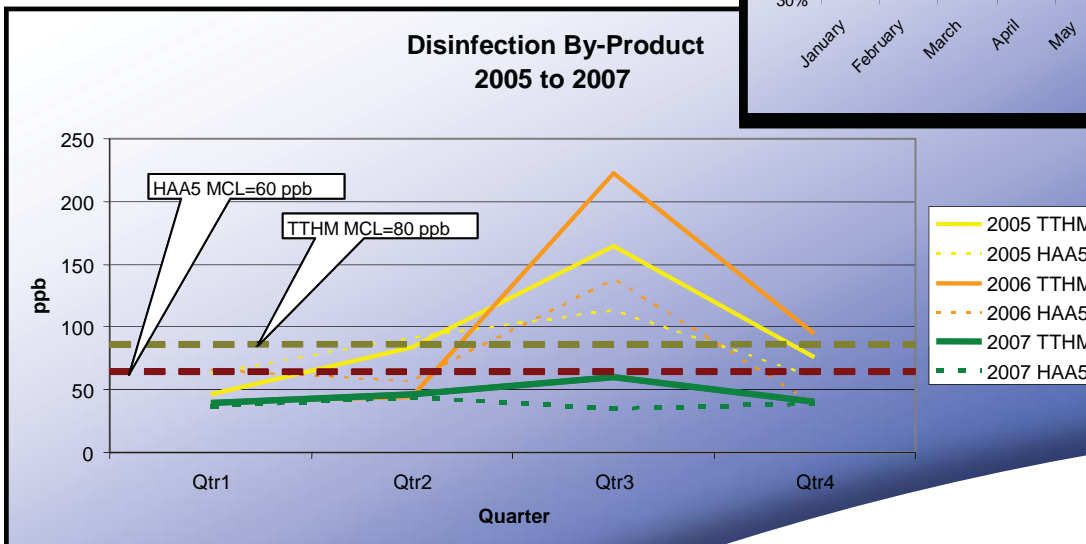
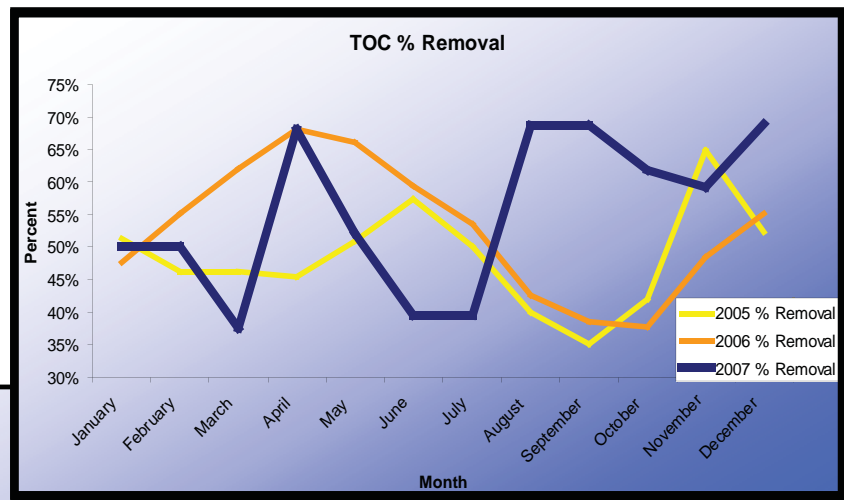
To answer the challenge, The City of Somersworth and Project Engineers from Wright Pierce looked at different clarification and filtration options. Following on-site pilot testing work and detailed process evaluations, the project team determined that installing Kruger's ACTIFLO® clarification process in conjunction with converting the existing up flow clarifier tanks into dual media filters was the best solution for the project.

The ACTIFLO® process consists of three process tanks with mixers followed by a settling tank. At the Somersworth plant, alum is properly dispersed and thoroughly mixed through in the first process tank. The water and flocculated materials then enter the second process tank where the recycled microsand is continuously injected. With the addition of polymer in the third process tank, heavy ballasted floc form and the high rate settling begins as the flow exits the third tank and enters the settling tank. Settled material is pumped from the bottom of the settling tank to a hydrocyclone for separation and microsand recovery. The use of microsand in the ACTIFLO® process greatly enhances the settling rate of the flocculated material allowing for a very small process footprint and the process to produce

consistent effluent quality under varying influent water quality and flow rates. The ACTIFLO® process is very simple to operate and maintain and requires a minimal amount of operator attention.

Conclusion

The effectiveness of the ACTIFLO® process followed by dual media filtration has allowed the Somersworth Water Treatment Plant to produce a finish water quality well below their current Stage 2 disinfection by-product limits. Since its start of operations in the summer of 2007, The ACTIFLO® clarification process has greatly improved the plants TOC removal capabilities year round; especially during the difficult to treat summer months.



Graph of Total Organic Carbon
Courtesy of Wright Pierce Engineering
Company

Graph of Disinfection By-Product
Courtesy of Wright Pierce Engineering Company