

DISINFECTION BYPRODUCT REDUCTION, BENNINGTON WATER TREATMENT FACILITY IMPROVEMENTS BENNINGTON, VERMONT



In 2003, Bennington failed the maximum contaminate level (MCL) for haloacetic acids (HAA's) at their surface water treatment facility. The Town retained Dufresne Group to evaluate alternatives to comply with the Federal standards. Dufresne Group evaluated options and recommended construction of various improvements at the existing surface water treatment facility. The most significant modifications included using ultraviolet light for primary disinfection and monochloramine for secondary disinfection. The Vermont Water Supply Division had identified the Bennington Water System as the #1 priority project 2004 due to the MCL violation for HAA's. Voters approved \$7,000,000 for the water system improvements in March of 2004.

In the last phase of final design, EPA released research indicating ultraviolet light was not as effective for viral inactivation as indicated in initial studies. After review of this research, Dufresne Group recommended that substantially more reactors were required, using significantly more energy. In addition, the research favored use of free chlorine in addition to ultraviolet light to insure virus inactivation. Based on this data, Dufresne Group recommended floor space be retained for future ultraviolet light and monochloramines, but the equipment would not be included in the construction project. Dufresne Group felt that the filtration process improvements should reduce precursors sufficiently to allow free chlorine to be retained as both a primary and secondary disinfectant. This recommendation proved accurate as the facility improvements were completed in 2007 and Bennington has been able to meet both Stage 1 and Stage 2 THM and HAA limits without use of alternative disinfection ever since.

Improvements to the Water Treatment Facility Included:

- Design of ultraviolet light for primary disinfection.
- Design of secondary disinfection using monochloramines
- Reduction in disinfection byproducts (DBP's) with process enhancements and using reduced chlorine
- Elimination of prechlorination prior to filtration
- Individual filter flow controllers
- Construction of a new clearwell with staged free chlorine residual control to reduce byproducts