

Algae Control Methods Compared: The Importance of Successful Algae Control for Facilities with UV Disinfection

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Problem:

In Connecticut, with the change over to UV from Chlorination for disinfection at some of the State's WPCFs (Water Pollution Control Facilities), it has been observed that an increase in attached algal growth along with a proliferation of a dense population of "tiny" snails (Pouch Snails) is occurring in the UV chamber(s). The end result appears to cause an "artificial" increase in Suspended Solids in the final effluent and at some facilities there is the need for filtration of the plant water in order to be able to recycle it back into the facility without maintenance problems.

Pilot Study Site and Detail of the Problem:

Between the State, Municipality and GillTrading.com, Inc., it was agreed that the Jewett City WWTP in Connecticut, which was built in 2005 to process 1.1 mgd of wastewater, would be the best site for a Pilot Study using Weir Washing technology. Unit processes for this plant consists of Pretreatment, Carousel type Nitrification/Denitrification, Clarification and UV disinfection. In 2006, the plant staff documented increased suspended solids in the final effluent samples, due to snail shells because a snail population had proliferated in the UV chamber(s). Mr. David Drobiak, the Superintendent of the Jewett City WWTP, requested assistance with this concern from the CT DEP. DEP biologist, Joe Nestico, had suggested that the high snail population appeared to be the direct result of an available food source i.e. attached algae growing in the UV chamber. Mr. Nestico suggested regular cleaning of the attached algal growth on the Clarifier Launderers and Weirs and washing of the UV chamber(s) to minimize or eliminate the snail population. The amount of maintenance by the Jewett staff was governed by the consistent reduction in algal growth and of course the snail population. In essence, there was a lot of consistent work to be done in order observe a "cause and affect" change in the problem.

In the design of the plant, consideration was made for attached algae control and a conventional Brush type system was installed for the two Secondary Clarifiers. Unfortunately, Jewett City found that with the Brush System, the algae were still allowed to grow on the scum baffles, weirs, brackets and other areas of the launder walls, slough off and finally settle in the UV chamber. The sloughed algae appears to not only provide a food source allowing the "tiny" snails to flourish and multiply but "seeded" the UV chamber thus promoting the colonization of attached algae on the chamber walls.

The Solution and Unit Performance:

The concept was to replace the Brush System with a Spray System to control the attached algae and reduce the resultant snail infestation, all of which would be done in the form of a Pilot Study.

Mr. Nestico had been contacted by GillTrading.com, Inc. to offer the WeirWasher Automated Cleaning System as a solution to the problems being faced by the Jewett City WWTP. The Weir Washer ACS is a non-contact cleaning approach utilizing non-potable plant water to form a rotational spray. The water jet action allows for uneven and porous surfaces to be cleaned while minimizing the amount of water used. The rotational spray acts as a lance, cutting away at the algae growth or debris attached to the tank surfaces. A programmable timer or SCADA, which makes it fully automated, operates the Weir Washer ACS. Mr. Nestico encouraged GTC, Inc. to pilot the Weir Washer ACS at the Jewett City plant to determine if the spray system would be able to control the attached algal growth in the Secondary Clarifiers such that it would also reduce or prevent any possible UV tube fouling and snail proliferation. There was also an expectation by all parties to minimize or eliminate the need for regular manual cleaning required by the staff. In the fall of 2006, a spare Secondary Clarifier was retrofitted so that only this tank with the spray system would be feeding clarified effluent into the UV chamber. Mr. Nestico, GillTrading, Mechanical Solutions, Jewett City and several local Southeastern District WPCFs provided free staff for the removal of the Brush System and installation of the Weir Washer ACS.

During the first year of operation, the plant water system which is needed to provide the 30 gpm flow at 65 psi pressure to the Weir Washer System was found to have a cracked pipe which for some time before and after its discovery minimized reliable or satisfactory cleaning results. However, even with inadequate flow and pressure, the Weir Washer System was providing better cleaning, less attached algal fouling in the UV chamber and an observable reduction in the snail population. In addition, manual cleaning was only required once a quarter instead of twice a month. A few mechanical issues with the spray system also required some attention. Weir Washer sustainability was part of the Pilot Study objectives and GTC has learned from these issues and was timely in correcting them. Although the Weir Washer System removed and minimized the majority of attached algal growth and regrowth, there appeared to be a residual, black in color growth that can remain. This remaining growth was determined to be dead, Coccoid Green algae, more of a cosmetic issue, and do not appear to be a food source for the snails. GTC, Mr. Nestico, Jewett City and the Maher Co. determined that the best way to address the remaining debris was to add a booster pump that would provide a pressure of 120 psi. By increasing the pressure, the addition of the Booster Pump has provided the desired results. What has resulted to date from the Pilot is that the facility has experienced a significant reduction of snails in the UV chamber, increased suspended solids due to the snail shells is no longer a concern, the facility staff is no longer manually cleaning the clarifier or UV chamber on a regular basis, and the black colored residual from the dead Coccoid Green attached algae is significantly reduced. In closing, although additional time will be needed to document sustainability of the cleaning system

while maintaining these satisfactory results, it appears to date that the Weir Washer is a viable and effective process to control and/or eliminate attached algal growth in Secondary Clarifiers, appears to be effective in snail population control in UV disinfection chambers and has vastly reduced staff maintenance time.