

PERACETIC ACID DISINFECTION

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The Berkeley Heights, NJ WWTP (3.1 MGD) was faced with more stringent effluent limits for chlorine produced oxidants (CPOs) and the potential to add other disinfection byproducts at stringent levels to the upcoming NJPDES renewal for the facility. Berkeley Heights had used sodium hypochlorite for disinfection followed by bisulfite for dechlorination. Ultraviolet (UV) disinfection is currently the accepted method of wastewater disinfection to avoid issues with CPOs and disinfection byproducts caused by disinfection with chlorine. Due to the high cost of reconfiguring the existing chlorine disinfection system and the UV purchase – Berkeley Heights decided to investigate other means of disinfection. Peracetic Acid (PAA) and its possible use as the sole wastewater disinfectant as opposed to a supplemental disinfectant was thought to have potential. Peracetic Acid is a combination of two simple ingredients - vinegar and hydrogen peroxide. After more research and investigation several sources of good information on the subject were obtained which made us believe PAA could be used as a disinfectant in municipal wastewater applications. Berkeley Heights conducted a trial study which showed very promising results (4/2016). This was discussed with NJDEP permitting and several meetings were initiated with the location of sampling points and study protocol ascertained. This was made part of the formal Quality Assurance Project Plan (QAPP) and submitted to NJDEP for review and approval. The study protocol was approved and the formal study began in January 2017 and was completed in May 2017. PAA was found to disinfect the wastewater effluent to provide compliant levels of both fecal coliform and E. coli. Flow pacing the addition of PAA was required to keep disinfection at an acceptable level. Several dosing locations were tried during the trial. PAA cannot be added at the head of sand filtration system. Those units showed an issue with PAA reacting with carbonates that had coated the sand in the tertiary sand filtration system from chemical addition for the nitrification system utilized in the overall treatment processes at the facility. Dosing at the end of the sand filters produced good results. Those results are continuing and ongoing. This location is our permanent dosing location. NJDEP has accepted the results and are making NJPDES permit modifications to enact that. There will be no more CPOs on the new permit. This is the first time PAA has been successfully used as the sole wastewater disinfectant in New Jersey. Sources of information have mentioned that industrial wastewaters can have an impact on PAA effectiveness. Berkeley Heights has a minor

industrial contribution and have not seen any industrial interference.

There will be a PAA residual requirement on the new permit. PAA residual is taken the same way as chlorine residuals (DPD pillows). The only difference is there is no waiting period before reading the color and recording the results. PAA residual readings are around 0.4 mg/l. The dosing rate is about 0.8 mg/l. Berkeley Heights is using about 9 gallons per day of PAA. PAA is provided by several suppliers and we utilize the lowest price. PAA comes in 275 gallon totes for supply. We are working with suppliers to receive larger bulk shipments to lower the cost. The delivery system is relatively the same as chlorine delivery systems. A small peristaltic pump and tubing (tubing needs to be replaced every year or stainless steel can be used as tubing). About 20 minutes of detention time is required for effective results. An existing chlorine contact chamber works very well. The operations and maintenance budgets are kept in check versus UV disinfection. The electrical costs and maintenance on UV systems – and the fact that UV systems don't produce a completely disinfected effluent – makes PAA disinfection more than a viable alternative to UV.

Berkeley Heights has evaluated the cost effectiveness of PAA versus chlorine (and dechlorination) and has shown that PAA is more cost effective. It also readily decomposes in the environment and exhibits very little toxicity. The NJPDES required effluent toxicity reports have come back with no toxicity exhibited. It is FDA approved and has been used in the United States food industry for decades. This could be an important and cost effective alternative to UV or chlorine disinfection and has beneficial impact on operation and maintenance requirements and cost.

Any wastewater facility facing stringent limits on CPOs in their NPDES permit should give some thought to doing some disinfection trials with PAA and if the results are encouraging – the next step is to contact the local regulatory agency and start the process of an alternative disinfection study and the requirements for conducting it. Berkeley Heights has found PAA to be an effective wastewater disinfectant and cost effective versus other disinfection methods and exhibits very little toxicity.

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