

Achieving TP Limits with Cloth Media Filter

Filtration| Case Study

North Attleborough Wastewater Treatment Facility

The Client

The North Attleborough Wastewater Treatment Facility (WWTF), located in North Attleborough, Massachusetts, collects and treats an average of 3.1 MGD of industrial and domestic wastewater from the Town of North Attleborough as well as the Town of Plainville, MA.



Benefits

- Retrofit
- Easy maintenance
- Convenient operation
- Achieves TP effluent below limit requirement

The Client's Needs

The North Attleborough, MA Wastewater Treatment Facility (WWTF) received a renewed discharge permit that required them to meet a monthly average effluent Total Phosphorus (TP) limit of 0.1 mg/L. The WWTF planned for Biological Nutrient Removal (BNR) process upgrades, but also needed a tertiary treatment process to guarantee that the stringent limit would be met. The facility wanted to use the existing footprint and infrastructure for the new upgrades in order to minimize project cost and avoid the need to expand the facility footprint.

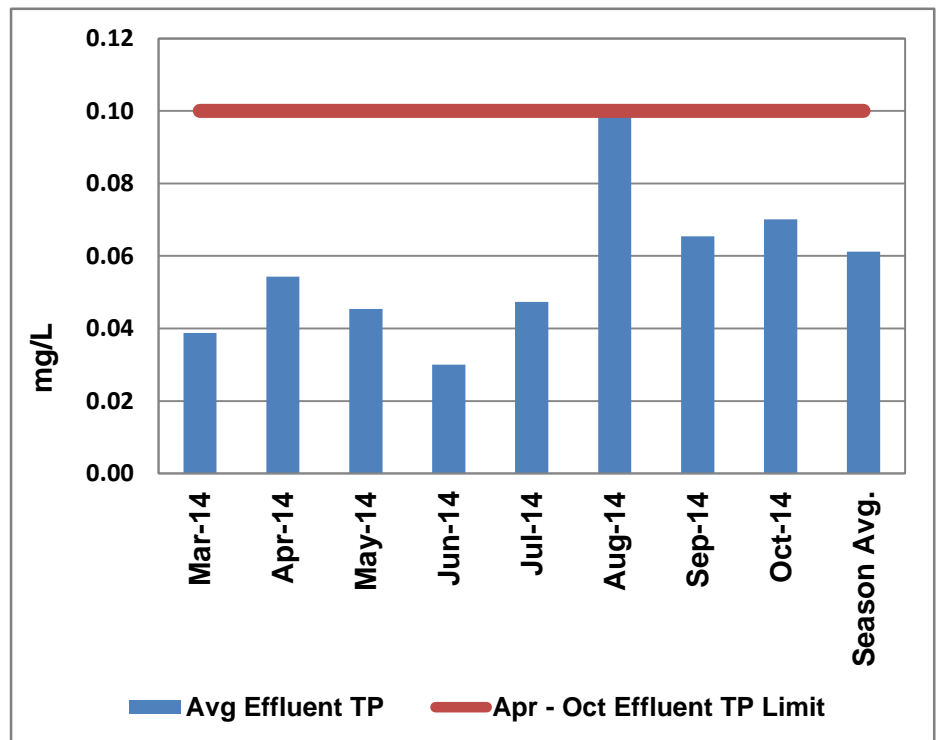
The Solution

The North Attleborough, MA Department of Public Works collaborated with their local consulting engineer to evaluate viable tertiary treatment alternatives to meet the facility's needs. The facility considered a number of options and numerous on-site pilot tests were conducted for several treatment technologies. Upon completion, the Hydrotech Discfilter system with upstream chemical pre-treatment was selected for tertiary TP removal. The system offered the benefits of lower life cycle cost, the ability to fit within the footprint of the existing traveling bridge filter (TBF) building and the facility's hydraulic profile, and the characteristic of being easy to operate and maintain. The system has since proven to meet the design parameters through initial performance testing as well as continued long term operations.

Process Description

The Hydrotech Discfilter system for the North Attleborough WWTF was designed to treat a peak hour flow of 17 MGD and an average day flow of 4.8 MGD while achieving an average effluent TP of ≤ 0.1 mg/L. Upstream of the filters are two mixing zone trains for the purpose of precipitating and flocculating the phosphorus from soluble to particulate form that can be captured and removed by the filters. Each train has 1 rapid mix zone (with 1 vertical shaft rapid mixer), followed by 3 coagulation/flocculation zones (each with 1 vertical shaft slow speed mixer). Coagulant is dosed upstream of the rapid mix zone, while polymer is dosed downstream of the first coagulation zone. The system includes six (6) of the model HSF2224-2F Hydrotech Discfilter units and is monitored and controlled by an integrated instrumentation and control system.

The facility operates the Discfilters year-round for effluent TSS polishing, but only operates the chemical pre-treatment system as required to meet the WWTF's TP limits. In March 2014, the facility began dosing chemicals and operating the pre-treatment system in conjunction with the Discfilters in preparation for the lower limit that would be required by permit starting in April of 2014. The effluent TP averaged below the permit limit of 0.1 mg/L (see Figure). The system continues to operate and enable the WWTF to meet permit limits.



Results

The Hydrotech Discfilter installation was the first cloth media filter installation specifically designed to achieve effluent TP of ≤ 0.1 mg/L. The system was able to conveniently fit within the existing facility footprint and hydraulic profile, while providing the benefit of simple operation and maintenance. The process includes chemical pre-treatment to precipitate soluble phosphorus. The Discfilter removes the precipitated phosphorus as well as phosphorus bound in the TSS from the upstream BNR process. Since commissioning in 2013, the Hydrotech Discfilter has provided the site with continued outstanding performance and enabled the WWTF to successfully achieve the stringent effluent requirement of ≤ 0.1 mg/L TP.

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