

Challenge testing membrane microfilters at a wastewater facility in the New York City watershed

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ABSTRACT

The Hobart wastewater treatment plant (WWTP) was upgraded in 2002 pursuant to New York City (NYC) Department of Environmental Protection (DEP) Watershed Rules and Regulations. The upgrade work included the addition of a tertiary treatment process, whereby secondary effluent from the extended air activated sludge process now undergoes rapid mix/flocculation, sand filtration, microfiltration (MF), and ultra violet (UV) disinfection, prior to discharge into the West Branch Delaware River. The upgrade was part of a broad program to ensure that wastewater treatment facilities which discharge into the NYC watershed upholds State Point Discharge Elimination System (SPDES) permit limits well into the future. Sand filtration prior to microfiltration is required per DEP specifications for SPDES upgraded WWTPs to ensure a reliable process. The membrane system at Hobart was therefore designed per the specification to treat the plant's rated capacity of 180,000 gpd (681,400 lpd) with upstream media filters serving as pretreatment. The microfilter's general capacity far exceeds that for which they are applied under the design specifications thus ensuring the robustness of the tertiary treatment process. This study was proactively conducted to challenge and verify the membrane system's capability to handle design and peak flows without the benefit of its upstream sand filtration online. In this study, the sand filters were bypassed and plant flows to the membranes was manipulated to simulate a series of peak flow events. With the sand filters offline, the plant's full hydraulic load was sent directly to the MF system following secondary clarification and coagulation. Specific objectives of the challenge test were to verify the MF system's capability to handle peak flows with the sand filters out of service; verify effluent quality and SPDES permit compliance using only the MF for filtration; provide plant operations personnel with the experience and confidence to successfully operate the membrane system through extreme conditions; generate full scale plant data to support current and future technical design specifications for membrane systems applied to SPDES upgraded WWTPs in the NYC watershed.

Keywords: Microfiltration; Sand filter; Flux; SPDES; EFM
