

ALTAPAC™ ULTRAFILTRATION SYSTEM WITH MINIMAL WASTE DISCHARGE

REMOTE, PRE-ENGINEERED AND FULLY AUTOMATED SYSTEM SOLUTION



Overview

Water treatment systems installed in remote locations require customized design strategies to minimize operator site visits. Unique challenges such as site access, system automation, waste management, and consumable usage and storage need to be addressed in the final design.

The Town of Fine, New York, elected to install a remotely accessible WesTech [AltaPac™ ultrafiltration \(UF\) system](#) to provide upgrades to the existing diatomaceous earth water treatment system. Due to the remote location, liquid discharge and storage capacity were limited making waste handling one of the most critical design considerations. In addition, piloting prior to designing the full-scale system was required by the state to demonstrate technology performance for drinking water standards.

A 38-day pilot study was conducted by WesTech to demonstrate the suitability of UF technology for treatment of Star Lake in a drinking water application. Automated pilot system operation included backwashing, cleaning, and membrane integrity testing as well as data logging for membrane integrity, feed and filtered water turbidity, feed and backwash flow rates, and feed and filtrate pressure. Data was also collected to assess transmembrane pressure, permeability, fouling rates, and cleaning efficacy.

The pilot study demonstrated that the UF system could consistently operate at greater than 95 percent recovery at an instantaneous flux of 46.5 gallons per square foot per day (gfd) and produce high-quality filtrate with very low turbidity. The study also demonstrated the effectiveness of backwashes and maintenance cleans and was able to verify cleaning frequency. A 100 percent pass rate for integrity testing was observed, and log removal values of up to 5.2 log were determined based on results. Overall, the study confirmed that UF was an effective treatment technology for the surface water source.

Project Summary

Remote Installation

Location:

Star Lake, New York

Application:

Drinking Water

Process:

Ultrafiltration

Highlights

- **Complete packaged AltaPac™ UF system**
- **Remote installation**
- **Fully automated system**
- **Minimal waste discharge**

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The full-scale design required a customized system capable of treating a feed flowrate of 300 gallons per minute (gpm) and incorporated the operational parameters determined during the pilot study. Remote access, waste storage capacity, and minimal operator interaction were key design components.

Raw water from Star Lake is fed directly to the membrane system. Lake turnover throughout the year results in a feed turbidity to the system between 0.3 NTU and 20 NTU and a temperature range of 3 to 20 degrees Celsius. Despite the changes in feed water quality and temperature, the system can produce consistent filtrate with a turbidity of < 0.10 NTU 95 percent of the time with a maximum turbidity of 0.3 NTU.

The flexible nature of the UF system provides the septic system more time to work properly. Waste generated on-site from backwashes and chemical cleans is collected in a septic tank and slowly released to a percolation field. The automated design allows for continuous monitoring of generated waste volume and produced filtrate quality to ensure a balanced and optimized system. Overall, the full-scale system meets or exceeds the specified drinking water requirements for the site and provides consumers with a safe and reliable water source while reducing the operator's daily maintenance requirements. ■



Table 1. Overview of Operating Setpoints for the Star Lake System

Parameter	Value
Design Feed Flow	300 gpm
Instantaneous Flux at Design Temperature	39.8 gfd at 3°C
Normalized Flux at 20°C	64.5 gfd
Production Interval	45 to 60 minutes
Maintenance Clean Frequency	Every 30 to 40 backwashes, NaOCl only
Clean-In-Place Frequency	1 to 2 times per year
System Recovery	> 97%