

Rushmere, BC

Pilot studies compare sand filtration and UF for reducing turbidity of lake water



September 2009 After two years of piloting, an ultrafiltration water treatment plant for the community of Rushmere, BC, was delivered. Located close to the Alberta border, this resort village draws surface water from Lake Windermere. The water has high turbidity levels and high amounts of organics.

BI Pure Water was commissioned to perform pilot testing with sand and cartridge filters on Lake Windermere in 2007. After three months of testing, the equipment could not reduce turbidity to a level below 1 NTU. Additionally, the filters needed to be changed every three days. This pilot did not meet BC drinking water guidelines.

A second pilot plant with UF was commissioned in the summer of 2008. The UF had 50 micron pre-filtration. Excellent results were obtained, leading to the selection of BI Pure Water as designer and manufacturer of a full-scale ultrafiltration water treatment plant with a capacity of 400 m³/day. The plant was commissioned in the summer of 2009.

The final treatment system consists of:

- Pre treatment with an injection of poly-aluminum chloride (PAC) into raw water helps to settle out larger particles. The amount of PAC is manually adjusted by the operator and used only in times of very high turbidity. Larger flocculated particles are then removed by a 50 micron mesh filter prior to ten parallel UF membrane modules for filtration.

The water treatment system and storage tanks were built in the factory in two containers with an internal door.

One of the banks of 5 UF vessels with a membrane CIP cleaning tank in front and wastewater tank for the automatic membrane backwash



CASE STUDY

- Original Norit Aquaflex hollow fiber were replaced after ten years of use with the newer Pentair X-Flow Aquaflex UF. With increased surface area this UF is performing particularly well. The UF vessels are installed vertically and connected directly to central feed, permeate, backwash and concentrate headers (“dead-end” ultra-filtration). The membranes are arranged in two banks, each consisting of five UF units.



- Membranes are automatically backwashed and have an air integrity test as required for potable water. Membrane cleaning is controlled by the plant’s PLC. A manual chemical Clean-In-Place procedure is used when required, typically once a year.

- The ultra-filtered water then passes through the 1 micron absolute cartridge filter as a safety measure against UF unit failure. Due to the purity of the incoming water, this filter will not see any load during normal operation.

- Final treatment consists of sodium hypochlorite disinfection. Mixing is performed by the static mixer prior to storage. Chlorine dosage is flow-paced in order to reach a minimum residual of 0.5 mg/L (ppm) in the distribution system and monitored by the chlorine analyzer located after the distribution pumps. If the chlorine residual drops below a user defined level, re-chlorination of the stored water takes place by recirculation and reinjection, using the backwash pump.

The Regional District recommends investing in a remote monitoring system which has greatly helped with plant maintenance.

BI Pure Water specializes in custom engineering, build, install, and servicing of package water treatment plants for remote communities.

The treated water storage tank, distribution pumps, and chlorine injection system with chlorine analyzer at far right of photo



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