

Toba Inlet Hydro, Powell River, BC

Water Treatment Objective: Metal filtration and turbidity reduction

October, 2017



A higher capacity UF package plant, with chlorine and air injection systems for the membrane backwash, is prepped for shipping

An additional ultrafiltration unit to double treatment capacity was ordered by Toba Inlet Hydropower 7 years after the original treatment plant was installed in 2010. The upgrade allows Toba to supply users up to 75 L/min. The Toba Montrose General Partnership (TMGP) is a 40/60 partnership between Alterra Power and GE Energy Financial Services that owns the Toba Montrose hydro-electric project, located near Powell River, BC.

The source of water for Toba Montrose is surface water, which has some metals in it. The water passes through iron and manganese removal filters to reduce these contaminants. Turbidity is also a problem at certain times of the year.

The new UF is an Inge Dizzer XL 1.5 MB 25W. A single membrane can produce 25 to 75 L/min of filtered water depending on raw water quality.

As the UF system produces water, the particulates collect on the feed side of the membrane and start to "foul" the membrane. This fouling exhibits itself as an increase in pressure differential across the membrane, also referred to as Trans-Membrane Pressure (TMP). The maximum TMP is 20 psi, but cleaning should be done to maintain the TMP below 15 psi. A new UF system typically starts with a TMP of 3-5 psi.

To keep the UF membrane clean, the system goes through a backwash cycle every 20-40 minutes. The interval is set during commissioning, but can be changed to match changes in raw water quality (e.g. during freshet). During the backwash, sodium hypochlorite and air is injected into the backwash stream to enhance the effectiveness of the cleaning. The BW duration is typically 5 minutes.

The existing treatment plant components consist of:

- Oxidation of dissolved metals to insoluble forms of iron, manganese, etc. by injection of a sodium hypochlorite solution
- Metals removal by manganese GreensandPlus filters.
- Injection of sodium hydroxide (caustic soda) for pH adjustment.
- Reduction of precipitates, suspended particles and pathogens with the new ultrafiltration unit



The main treatment plant with GreensandPlus filter vessels on the right. The older Seccua UF system has been replaced by the new UF building

is typically shipped to BI Pure Water for chemical cleaning but is otherwise low maintenance.

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

- 20, 5 and 1 micron absolute cartridge filters in series as a back-up to the UF unit; colour elimination and taste and odor improvement by activated carbon filters
- Further reduction of cysts, pathogenic bacteria and viruses by use of an ultraviolet microbiological disinfection system, meeting the requirements of the NSF 55 Class A protocol.

Tertiary disinfection of the UV treated water is accomplished with an injection of a sodium hypochlorite solution for a minimum chlorine residual of 0.5 mg/L (ppm) in the distribution system.

The new UF building is piped to the original treatment plant. Every few years the UF membrane



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