



First Nations Community Emergency Water Treatment Plant

Bi Pure Water supplied an emergency water treatment plant for a First Nation Community (FNC) in Ontario. Their old plant was flooded by the rising Lake Huron water. Our team was able to help them quickly and efficiently.



Figure 1: Exterior after installation

Objective

Usually the turbidity level is less than 1 NTU. However, during spring break-up and after storms it can reach higher levels for short periods. In compliance with the Canadian Drinking Water Quality, our system has a > 4 log (99.99%) reduction of viruses, > 3 log (99.9%) reduction of Giardia and Cryptosporidium, and reduction of turbidity < 0.3 NTU.

About the System

Designed and manufactured in Surrey, BC by Bi Pure Water Canada Inc., the PWTP system was factory fabricated as a modular building unit. This approach allows factory testing of the process and greatly reduces the construction time on site. The plant has a truckfill station as there are no underground distribution lines. It also has water storage for up to 20,000 liters. The design-build project will provide treated water production flow from 100 L/min and truckfill pumping at 660 L/min.



Figure 2: Interior of completed system

Key Features:

Water Source: Lake Huron

Peak Flow Rate: 100 L/min

Treatment:

1. Triple filtration
2. Activated Carbon in a vessel
3. Ultraviolet (UV) disinfection
4. Sodium Hypochlorite

Dimensions: 53 Ft x 8 Ft x 11 Ft

Partnerships

In collaboration with FNC, ISC, FNESL, and RESEAU CMI, Bi Pure Water was able to deliver the water treatment plant in record time to meet the emergency.

Raw Water Pump and Pressure Control

The submersible raw water pumps will be controlled by a level transmitter installed in the storage tank. The level transmitter will start the treatment process based on the water level in the tank. The duty UV is activated and allowed to warm up for a set time (approximately 5 minutes). Once the UV is warmed up, the raw water submersible pump is started. The submersible pump is on a VFD and will run at a fixed speed. The operator can increase or decrease the pump speed as required.

The single truckfill arm station comes with an insulated & heat traced truckfill pipe for cold weather.



Figure 3: Truckfill arm operating

The Process

Chlorination is provided by a sodium hypochlorite solution being pumped from the solution tank into the filtered water line after the UV units with the dosing pump. A static mixer is used to ensure uniform blending in the production line. The amount of sodium hypochlorite added is flow paced to a flow meter, so it automatically adjusts to varying flow. The free chlorine residual after the storage tanks should be measured periodically to confirm that sufficient chlorine is being added. A good target is a minimum of 0.4 mg/L to 0.6 mg/L to ensure sufficient chlorine after delivery to residents.

A second chlorine injection is done before exiting the plant, using a metering pump and flow pacing. This chlorine pump adds free chlorine to the treated water storage tank to make the final chlorine concentration close to 0.5 mg/L. The chlorine residual is measured manually through sampling points before and after the main treatment process and a set point modification is done if warranted. An automatic, continuous, online chlorine analyzer is also provided to monitor the system.

BIPW specializes in reviewing water quality test results, analyzing customer needs and then prescribing the most cost-effective solution. Our engineers and staff pilot, design, manufacture, install, start-up and commission package water & wastewater treatment plants. The operators are then trained and the plants can be serviced on a regular basis.

These package water treatment plants are cost-effective because:

- The water treatment plants are custom engineered to a specific water analysis and budget.
- The plant can be built in the Port Kells factory where the trained staff works.
- The completed water treatment plant is quality, leak- and flow- tested at the factory.



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