

Treating Water in a Remote Location

WesTech Package Treatment Plant



CASE STUDY

Location: Cross Lake, Manitoba, Canada
Owner: Cross Lake First Nation
Engineer: SEG Engineering
Contractor: Wescan Mechanical Services

Substantial Problem

In 2003, SEG Engineering was contracted to design a new water treatment plant for the Cross Lake First Nation. Located approximately 370 miles north of Winnipeg, this remote community of 5,000 people is only accessible by air or, during the cold winter months, by ice roads. Inaccessibility, cold weather, and high raw-water color were only a few of the design challenges that SEG Engineering faced for this new water treatment plant. After much evaluation, SEG Engineering concluded that a packaged water treatment plant utilizing two-stage filtration was the best available technology for the project.

Simple Solution

Based on this evaluation, SEG Engineering developed a detailed equipment specification that included minimum outlet performance requirements. These performance specifications required outlet turbidities of less than 0.1 NTU, color less than 5 Pt-Co units, and Trihalomethanes less than 60 µg/L.

Raw water from Cross Lake has turbidities ranging from 9-12 NTU and raw water color as high as 126 Pt-Co units.

Package Treatment Plant

In the fall of 2004, WesTech Engineering was contracted to supply a 350 gpm Package Treatment Plant. The Package Treatment Plant is a skid-mounted treatment unit that utilizes a buoyant, up-flow, coarse media roughing filter followed by a downflow, fine-media polishing filter.

Water enters the Package Treatment Plant and flows up through 48" of 3-5 mm polyethylene media where approximately 85% of the raw water turbidity and color is removed. The buoyant media is retained in the roughing filter by a stainless steel screen. The flow is then fed onto the polishing filter which has 18" of 1.1 mm anthracite, 9" of 0.55mm silica sand, and 3" of 0.40 mm garnet. The polishing filter media is supported by an all stainless-steel, direct-retention underdrain. The Package Treatment Plant is fabricated from marine-grade aluminum, eliminating the need for coating maintenance associated with epoxy-coated carbon steel.

The WesTech-provided PLC controls allow for automatic operation of the treatment unit and chemical feed system, as well as automated backwashing of the filters. Backwash of the roughing filter is done using untreated raw water, whereas the polishing filter is periodically backwashed with treated water.

In May of 2005, during a seven-day performance test, WesTech successfully demonstrated that the Package Treatment Plant could meet or exceed all of the performance criteria required and the plant was turned over to the Cross Lake First Nation.