

# Mount Polley, BC

March, 2014



*NASA aerial photos of the Mount Polley Mine site July 24, 2014 before the dam breach and after*

BI Pure Water (Canada) Inc. designed and manufactured a mobile water treatment pilot plant for Imperial Metals Corporation to reduce the amount of waste water in the tailings storage pond at their Mount Polley open pit copper and gold mine. The water level was rising in the storage pond and a cost-effective method of treating the wastewater was required.

In treating “difficult” water, it is recommended that a pilot test be conducted to optimize membrane selection and determine the efficiency of removal of regulated substances. The pilot plant was capable of treating 31 LPM (8.1 USGPM) of raw water.

After assembly of the mobile pilot plant, BI Pure Water staff went to site to operate the plant and collect data. This operation lasted a few months during the harsh winter weather conditions.

A high recovery rate (85%) and the fouling properties of the sharp aluminum silicate (<0.2 micron) particles in the raw water was the goal.

Calcium, iron and manganese were also present in the raw water but the anti-scalant prevented any scaling on the membrane. There was no anti-scalant that would remove the silicates.

With the cartridge filtration, ultrafiltration (UF) and reverse osmosis (RO) filtration processes in place, treated water coming out of this plant exceeded the quality to meet discharge into the natural environment.

On the second trial, it was determined that the sulphates were very high and interfered with the nitrate rejection. Copper and zinc levels turned out to be slightly higher than the maximum allowable. These metals were in total suspended, rather than the dissolved form.



*A pilot plant identified appropriate membranes capable of treating the difficult mine wastewater*

For the third trial in January 2014 a UF membrane at 0.02 micron was utilized and this protected the RO membrane from any silicates. The recovery ratio of the RO system was run at 76%, based on projections from the membrane manufacturer and the anti-scalant provider. Digital trials at 4 and 25 deg. C were performed and nitrate removal tracked similar to the software predictions. The site trial was run at 300 psi and approximately 4 deg. C. No drop in flow or pressures was observed.

There is little documented evidence of previous treatment on this type of cold mine-use water during winter. Even with the challenges of cold weather and cold water, these last modifications to the pilot plant ended up producing permeate water that met BC Environment standards. This pilot testing study will save considerable money when designing and building the full-scale plant.

Unfortunately, the Mount Polley Mine storage pond wall breached on August 4, 2014. In retrospect, if this pilot plant had continued operating at the mine site, the containment wall failure of August 4, 2014 likely wouldn't have happened. Removing approximately 23 LPM (6 USGPM) of treated water from the pond would have added up to close to 6 million Liters (1,585,000 USG) in six months.

BI Pure Water specializes in reviewing water quality test results and prescribing the most cost-effective solution. BIPW Engineers pilot, design, manufacture, install, start-up and commission package water and wastewater treatment plants. The operators are then trained and the plants can be serviced on a regular basis. BIPW focuses on small and medium-sized water treatment plants to meet the needs of Federal, Provincial and Municipal Governments, Industrial Processes, Private Water Systems, Resorts & First Nations.



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