CASE STUDY

Kugluktuk, Nunavut

November, 2017

The hamlet of Kugluktuk, Nunavut, known as Coppermine until 1996, has a population of 1500 and growing. Its location at the mouth of the Coppermine River, and on the shore of the Arctic Ocean on the Canadian Shield creates a challenging water source. The drinking water suffers from turbidity, solids, and salt water intrusions. The water treatment upgrade is to provide additional supply and a system to address turbidity in the existing water supply which is above the allowable limit.

The new water treatment plant and the sump with turbid raw water intake

Williams Engineering in Winnipeg designed the plant with a clarifier and low maintenance, low energy slow sand filtration. The water is then disinfected with UV and chlorination. The treated water recirculation system runs continuously to prevent the water from freezing.

NDL Construction of Winnipeg was awarded the construction and BI Pure Water the treatment system components. The building and tanks were fabricated on site and the system was field installed. The tanks were efficiently bolted together on-site from parts that were shipped to the community.

BI Pure Water built and shipped the treatment system components on skids and reassembled the system on-site. The components included a CFS (coagulant-flocculent-sedimentation) system of steel tanks and chemical feed to aid the slow sand filtration. UV and chlorine provide the disinfection.

The Raw water is gravity fed from the existing water treatment plant which is supplied from the nearby Coppermine River. The new water treatment building is piped from the older plant. Raw water enters the new treatment plant at up to 578 L/min to fill the treated water tanks. The raw water feeding the new

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Water sampling of the clarifier is undertaken as the Schmutzdecke develops.

Below: The roughing and slow sand filters viewed from the roof of the new treatment plant

treatment plant is continuously monitored for salinity. Upon detection of salt in the incoming water a motorized valve MCV01 will drive closed and an alarm condition will be reported through the PLC.

The CFS system for the clarifier helps settle out the larger particles before water enters the roughing and slow sand filters. In the Arctic environment it took longer than usual for the Schmutzdecke or top fine filter layer to develop and begin reducing bacteria and particles, but now the system is meeting its objective of reducing the NTU to 0.3 or less.

Operators use the remote monitoring so they visit the plant just a few times a week, and outside service staff can login to view and help troubleshoot the control system.

To help with operator training and turnover, operators can watch the training and maintenance videos, much of which was filmed on-site.

Kugluktuk is the eighth community water treatment system built and serviced by BI Pure Water for the government of Nunavut. BI Pure Water specializes in custom engineering, build, install, and servicing of package water treatment plants for remote communities.

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