Ravindren Krishnasamy

Title
Slow Sand Filtration in Cold Temperatures

Abstract:
Slow sand filtration is making a successful comeback in North America due to its ease of operation, low maintenance requirements, and practicality for small and remote systems, particularly First Nations communities. When preceded by a roughing filter, its treatment performance with variable quality surface water and seasonally cold water temperatures has been proven. However the technology has yet to be systematically challenged under extended operation in consistent cold temperatures, which is typical of far north communities (ie. north of 60). This research characterizes the startup and long-term performance of modified slow sand filters in cold climates, to define the range that it can perform satisfactorily for small systems in North America.

Two pilot-scale systems have been constructed in a refrigerated environment to simulate cold climate conditions and evaluate treatment performance under challenging water quality conditions. The study investigated methods of improving start-up performance in cold temperatures and optimizing the process for use in northern communities. Results are based on a comparison of two pilot systems, one of which has been seeded with cold-adaptive bacteria for enhancing biological treatment.

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Supervisor
Onita Basu