Improved Wastewater Treatment For Northern Communities

Through Advances In Technology

Introduction

Wastewater treatment in the North is extremely important for the protection of human health and the environment.

Treating domestic wastewater in Northern communities comes with it’s own set of challenges.

Challenges of Domestic Wastewater Treatment in Northern Communities

1. Remoteness of the communities
   - Often making regular maintenance difficult and expensive
2. Extreme climate conditions
3. Access to spare parts
4. Access to assistance and mentoring

Methods of Wastewater treatment in Northern Communities

Primary treatment is generally provided through the use of:

- Passive Treatment Ponds (Sewage Lagoons)
- Mechanical Plants - (Very Few)

Methods of Wastewater treatment in Northern Communities

Most Communities use passive treatment systems.

The passive treatment systems are well suited for the north, however, the level of treatment is low.

Effective treatment is equivalent to primary treatment.

Methods of Wastewater treatment in Northern Communities

Some of the of the passive systems use or incorporate wet lands into the treatment process to further treat the effluent.

The effectiveness of wet lands is generally low due to low temperatures, channeling and the short summer season.

Results of Poor Treatment

Primary concerns:

1. Human health hazards: Sanitation Related Diseases
   - E-coli and fecal coliform bacteria
   - (near and around the receiving waters)
   - Contamination of drinking water supply

Results of Poor Treatment

Environmental concerns:

1. Environmental Concerns:
   - Contamination of Receiving waters with the following
     - Organic Carbon
     - Suspended solids
     - Ammonia NH3
     - Phosphorus

All of these contaminates can be detrimental to the aquatic life in the receiving waters

Example – Sewage lagoon

Sewage lagoons provide primary treatment however can be difficult to manage during changing weather conditions and seasons.

Example: Mechanical Process

Solids are mechanically separated from the sewage. The clarified sewage is aerated for a short period of time prior to discharge.

Example: Mechanical Process

Solids Separator: Removes solids from the domestic wastewater prior to discharge

Example: Primary Treated Sewage Outfall to Wetland

The outfall shown, is significant human health hazard

Goals For the Future

Keys to Success:

1. Develop Technologies and Treatment systems which provide a much higher degree of treatment. The outfall from these Systems/plants would minimize the risk to human health and to the environment.
2. Ensure that these systems are suited to the Northern challenges previously mentioned and are dependable.

Goals For the Future

Keys to Success:

3. Ensure plant operators are adequately trained to operate new equipment
4. Develop partnerships to provide an ongoing support programs which would provide operators the support required to operate and maintain equipment

New Technologies

Membrane Bioreactors:

MBR systems are being adapted for use in food and beverage industry, remote mining camps, breweries and many more applications, too numerous to mention.

The advantages of MBR systems are:

1. Very small footprint for the amount of volume processed
2. Energy requirement is relatively low
3. The membrane acts as a barrier to bacteria. The Quality of effluent is extremely high

New Technologies

Membrane Bioreactors:

4. The MBR system is relatively easy to operate and require very little maintenance.
5. Systems can be remotely monitored and process adjustments can be made if required
6. Systems can be containerized or skid mounted for installation in a building

New Technologies

Membrane Bioreactors:

Brief Description of the Treatment Process:

Membrane Bioreactors are aerobic systems which use naturally occurring bacteria to treat the sewage. The sewage enters an equalization tank which stabilizes the feed flow to the MBR system.

The raw sewage is then pumped to an aeration chamber to expose the sewage to the bacteria. The aeration provides oxygen for the bacteria to metabolize the BOD.

Water overflows in from the aeration chamber into the membrane tank. A very slight vacuum is drawn on the filtrate (clean water side of the membrane)

New Technologies

Membrane Bioreactors:

Brief Description of the Treatment Process:

The pores in the membrane are so small that only water and dissolved matter can pass through the membrane.

The water which has passed through the membrane is call filtrate. The filtrate is pumped through a UV disinfection system and the water is ready to be discharged to the receiving water body.

Containerized Membrane Bioreactor

Northern Communities Domestic Wastewater Treatment

Large Containerized Systems

MBR Systems

Northern Communities Domestic Wastewater Treatment

Systems for smaller Communities or for treatment of Pond Effluent prior to discharge

OPERATOR TRAINING

1. Operator Training plays an extremely important role in operation and maintenance of a wastewater treatment plant

2. Investment in Operator Training is one of the best methods to lower operating costs:

3. BLM can evaluate your existing treatment system and develop an operator training program specifically for your treatment system.

WTP/WWTP Treatment System Maintenance

1. BLM can perform an assessment of your current treatment system and develop maintenance and preventative maintenance schedules for the equipment in your plant.
2. We can ensure that spare parts lists are available and ensure that parts are available for your systems next scheduled maintenance
3. BLM can provide phone support for technical or process questions.
4. Our Field Service Team can also provide on site support if required.

WTP

On-Site WTP:

Field Service Teams

On-Site FSR Teams:

Checking STP Outfall

Arriving at a site

- Questions???