

Case study:

Simple, cost-effective sludge management in the far north

- Bishop Solids Management Solution
- Pangnirtung Wastewater Treatment Plant
- Pangnirtung, Nunavut, Canada

The challenge:

Cost-effectively achieving safe, simple indoor sludge management in the far north

Sludge management is challenging for the remote Hamlet of Pangnirtung, Nunavut on Baffin Island. The site experiences below zero temperatures for eight months of the year, which means that every process in its 300 m³/day (79,000 gpd) ZeeWeed Membrane Bioreactor (MBR) treatment plant must be performed indoors—even sludge management.

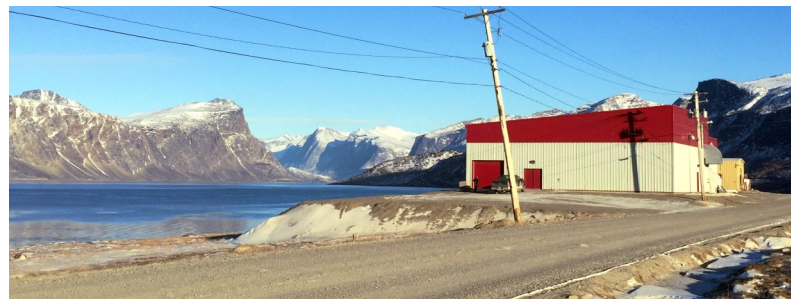
When the community was considering replacing its original rotating biological contactor system with the MBR, operators intended to continue using an existing sludge bagging system that used a series of small bags connected to a manifold to collect and dewater sludge.

But the system was difficult for operators to manage since they were required to manually remove and handle the bags, then load them onto a truck for disposal. The process was not only awkward in the small available space, it also increased the risk of operator exposure to the pathogenic sludge and filtrate. A solution was needed that would offer simple, reliable operation, improved operator safety, affordable capital and operating costs and fit into the limited space within the compact plant.

The solution:

Working once again with consulting engineering firm EXP, which designed and managed the ZeeWeed MBR project, the community began evaluating options for sludge management. “We briefly considered a centrifuge or filter press to dewater the sludge because those systems could fit the small space that was available,” said Daryl Burke, EXP Process Engineer, Water and Wastewater Services. “But we couldn’t justify such a complex system there, where higher costs and limited access to parts and service expertise would be an issue.”

The project team then learned about the Bishop Solids Management Solution, which uses Geotube[®] geotextile containers and an easy-to-operate polymer system for low-energy sludge containment and dewatering. The simple system prevailed as the preferred option, not only for its energy efficiency, but also because it could be customized to fit the available space and would eliminate concerns over parts and service for the remote community.





The hydraulic dump trailer shown with a newly installed Geotube® container. The VEPAS (right) mixes and activates polymer in a single step, then injects it directly into the sludge feed line.

The solution that the team designed uses a Geotube® container positioned in a hydraulic dump trailer, which sits in a heated garage bay of the plant. Waste sludge from an 80 m³ (21,000 gal) storage tank is pumped in batches about two times per week to the Geotube® container.

As the sludge is pumped, the VEPAS (Venturi Emulsion Polymer Activation System) mixes and activates polymer in a single step, then injects it directly into the sludge feed line. The polymer aids in retaining solids within the Geotube® and accelerates dewatering.

Both the sludge pump and VEPAS are connected to the plant's SCADA system, enabling a high level of process automation. As dewatering occurs, low-TSS filtrate drains from the porous Geotube® onto a sloped concrete pad and into a sump. The filtrate is then pumped back to the plant headworks.

The results:

The Results: Improved operator safety and reduced operating costs

Since commissioning the Bishop Solids Management Solution, operators are no longer required to handle dewatering bags and face the risk of exposure to pathogens. Once the 30m³ Geotube® container is full, operators simply pull the trailer by truck to the landfill, dump the bag and replace it once the empty trailer is returned to the plant.

Maintenance is also simple. After the batch run is complete, operators just flush the VEPAS system with clean water. Unlike conventional polymer systems, there are no mix tanks or mixers to clean so the whole process can be completed in about 30 minutes. "The polymer system is about as simple as it gets," said Burke. "The whole system is very simple to operate and easy to understand what's going on."

With few consumables required for operation, the system fits very well with the way the remote community orders and stores supplies. The system uses only one or two drums of polymer per year and about 12 - 15 Geotube® containers.

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*Daryl Burke, EXP
Process Engineer,
Water and Wastewater Services*

These consumables are ordered only once per year, delivered in one shipment and stored until needed. Both the polymer and Geotubes can be stored outside if needed. Bishop Water has also provided essential spare parts, such as venturis for the VEPAS, otherwise most other parts are off-the shelf components that can be easily obtained and transported relatively quickly to Pangnirtung.



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