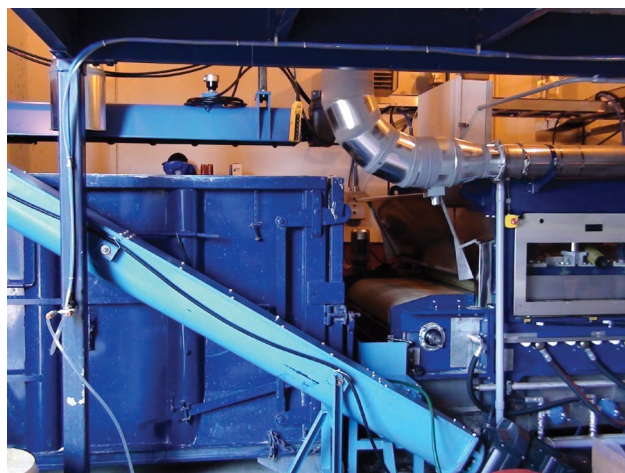


Advanced Dewatering

RAEBL, Montreal, Canada

How we created value

- Significant reduction in the plants' overall disposal cost
- Cost competitiveness (capital and cost of operation)
- Seamless integration with existing processes and equipment
- Adjustable output, 30-45% TS (50-70% cake weight reduction) with exceptional energy efficiency
- Small footprint
- Pathogen elimination (P-1/Class A grade)



Linear Electro-Dewatering reduces cake volume and improves biosolids quality, driving significant cost reductions for municipalities.

Background

The RAEBL municipal wastewater treatment plant in Montreal has an average daily flow of 17 MGD, producing about 100 wet tons of residual sludge per day, 5 days a week. Three (3) Belt filter presses dewater the waste-activated sludge to 14.5%TS. The level of pathogens contained in the residuals rule out land application or soil remediation, and the high water content disqualified sound energy scenarios. Consequently, the sludge is hauled to a landfill and beneficial re-use is not possible.

With stringent state regulations, disposal costs were expected to increase by 14% to over \$84(CAD) per wet ton, starting October 1st, 2010. The plant's management team sought long term solutions to overcome this financial burden while investigating alternatives for beneficial re-use of their cake.

Obtaining P-1 product classification (similar to Class A grade in the US) offers attractive options for land application or soil amendment. Weight reduction also evidently revealed economy potential for the plant's overall disposal cost.

After reviewing commercially available solutions, Ovivo's CINETIK® advanced dewatering technology (Linear Electro-Dewatering) was selected.

Process

Linear Electro-Dewatering provides improved solid-liquid phase separation over mechanical technologies. Ovivo's CINETIK® equipment uses electro-osmosis to allow mechanically dewatered cake to reach high dryness levels by applying a continuous current to electrodes sandwiching the porous media. Current causes the transfer of cations from the positive (anode) to the negative (cathode) pole. The cations drive the bulk water molecules towards the cathode, where water is drained out. By changing the operating parameters, a final dryness of 30-50% can be achieved, and weight is usually reduced by more than 50%.

Application of an electrical current to sludge not only drains out adsorbed water, it also has a direct impact on its quality. The combination of electricity, heat and pressure disinfects the biomass, eliminating E.Coli, salmonella, enteric viruses and parasites, and the end product is a P-1 (or Class A) biosolids that can readily be put to beneficial use.

As the process does not evaporate the water, but “pulls” on it instead, energy usage has no comparison with thermal solutions. The CINETIK equipment is, in fact, 3-5 times more energy efficient than typical dryers. Since most biosolids become autogenous at 35-40% DS, the technology is a major driver for biomass-to-energy scenarios, offering the capability to generate a positive energy balance and capture the residuals’ calorific value as a fuel.

Performance

A first equipment, rated 1.2 wet tons per hour, has been installed at RAEBL and commissioned in August 2009. It processes a little more than 1/3 of the production, taking the 14.5% DS cake off the belt filter presses and dewatering it to 35% DS. This setting has been selected for capacity optimization and maximum disposal cost savings. Energy usage is in the order of 140 kWh/ton of wet cake processed or 300 kWh/ton of extracted liquid. The CINETIK equipment contains over 95% of the Total Suspended Solids (TSS) that are returned straight to the Headworks. This translates into a volume and weight reduction of about 60%, generating a straight saving on the plant’s operating budget established at about 40% (reduced handling, transportation, tipping fees and taxes). The payback of the advanced dewatering solution at the plant is less than 4 years. Nevertheless, RAEBL is also looking at further opportunities for beneficial re-use through compost farms or soil amendment. Dewatering the cake to 45% TS or more with the equipment would increase the solids’ content even further and enable biomass-to-energy alternatives on-site, or with a local cement kiln operator. Either of these scenarios would impact significantly the overall plant economics.

Ovivo’s CINETIK advanced dewatering technology offers wastewater treatment plants a control over rapidly increasing sludge disposal costs and regulation, with one of the most cost efficient solutions currently available in the market.



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