REGEN BAF

Case Study: Wastewater Lagoon Upgrade
Location: PEI, Canada, July 2017

Overview:

There are over 6000 wastewater lagoon treatment systems currently in operation across North America. Lagoon infrastructure is a reliable and robust solution for wastewater treatment. Upgrade options are required for lagoons due to increasing capacity requirements or more stringent discharge standards.

The REGEN wastewater lagoon treatment solution incorporates a low-complexity, fixed film wastewater treatment process that is easily added in series or parallel to existing lagoon wastewater infrastructure.

Low-energy operation allows for potential integration with renewable energy sources. Chemical-free operation allows for low-complexity and cost effective operation.

The latest REGEN solution has been validated at the Wyman's blueberry processing facility in Morell, Prince Edward Island.

REGEN BAF site install
Morell, PEI, Canada

Results:

"The pilot system removed > 10 kg/day of COD from the lagoon. The BOD concentration was reduced from 240 mg/L to <10 mg/L. Removal rates of ≥ 95% were observed for COD, BOD and TSS"

A full scale, 40' ISO container systems would remove > 10 kg/BOD or > 40kg/COD per day from the lagoon and could be operated for wastewater polishing or in recirculation.

REGEN BAF low strength sample data									
	6 days running			8 days running			15 days running		
	Influent	Effluent	Removal Rate	Influent	Effluent	Removal Rate	Influent	Effluent	Removal Rate
BOD mg/L	42	<10	76%	64	<10	84%	240	<10	96%
COD mg/L	30	<10	67%	250	46	72%	1000	50	95%
TSS mg/L	87	3	97%	183	3	93%	771	4	99%

*The lower detection limit for BOD and COD was 10 mg/L

95% BOD, COD & TSS removal
15 day operation

REGEN BAF performance over 15 days of testing with "low strength wastewater"

Average Values for Low Strength Testing

Concentration mg/L

BOD: 115.3 / 10.0
COD: 423.7 / 35.3
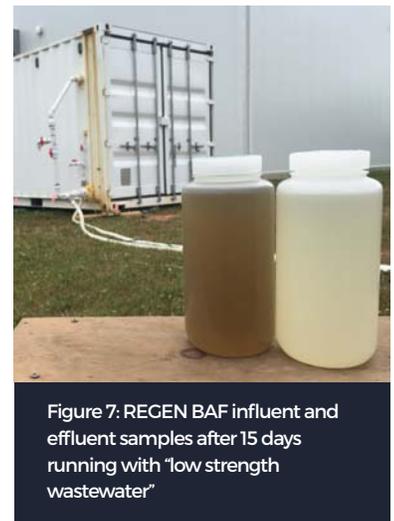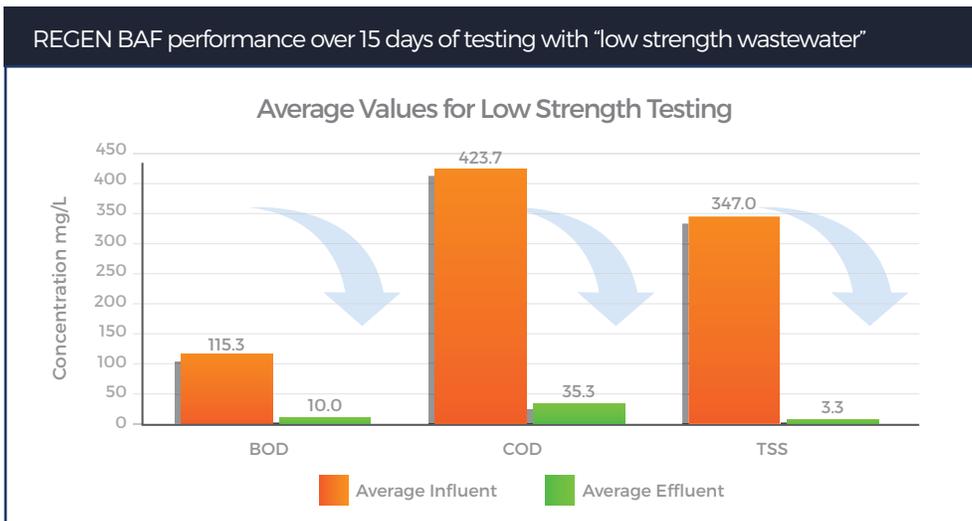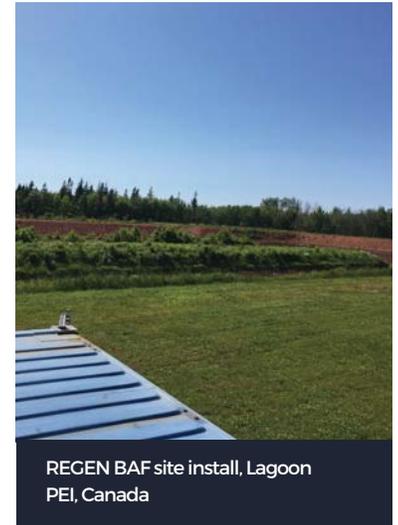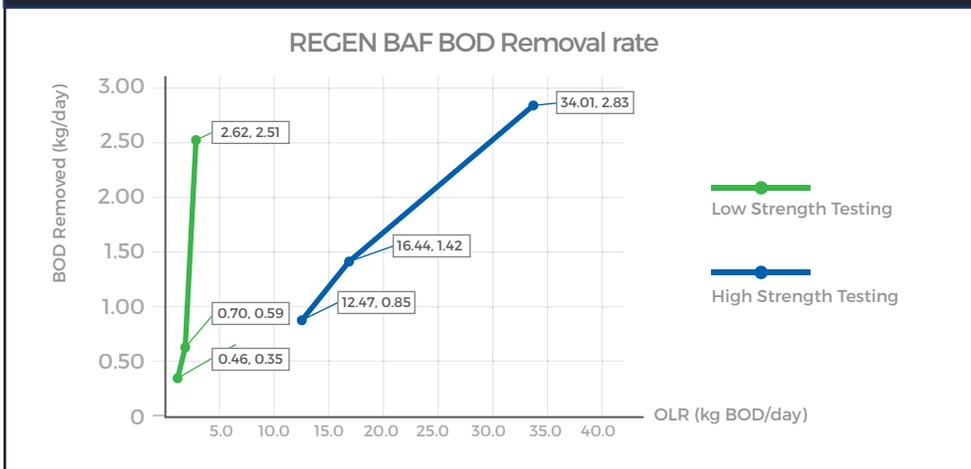TSS: 347.0 / 3.3

■ Average Influent   ■ Average Effluent

Figure 7: REGEN BAF influent and effluent samples after 15 days running with "low strength wastewater"

REGEN BAF relationship between organic loading rate and BOD removal

REGEN BAF BOD Removal rate

Data points (Low Strength Testing): 2.62, 2.51; 0.70, 0.59; 0.46, 0.35

Data points (High Strength Testing): 34.01, 2.83; 16.44, 1.42; 12.47, 0.85

Y-axis: BOD Removed (kg/day)
X-axis: OLR (kg BOD/day)

Legend: Low Strength Testing; High Strength Testing

REGEN BAF site install, Lagoon
PEI, Canada

The REGEN BAF testing at Wyman's has proven that the system can supplement under performing lagoons. Running the system with it discharging back into the lagoon helps to reduce the load and provide aeration to the lagoon, aiding in the overall lagoon performance. Lower strength lagoons can place the REGEN BAF at the back end to ensure discharge limits are met. Both options would be a cost-effective alternative to replacing or upgrading existing under performing systems.

The installation of the REGEN BAF pilot scale system at Wyman's blueberry processing facility in Morell, PEI was a success. The system was easily installed over a 2 day period and ran smoothly for a Summer and Fall testing period. The REG EN BAF treatment system would benefit Wyman's if operated in conjunction with their current lagoon. The BAF could operate up to 8 months per year, without energy for heating wastewater where it could discharge back into the lagoon. The BAF could remove up to 11 kg BOD / day (or > 40 kg COD / day) using a 40' full scale REGEN BAF system and discharge aerated wastewater back into the lagoon which would boost the lagoon performance.

REGEN BAF site install
PEI, Canada

Conclusion:

Seasonally operated lagoons would benefit from the REGEN BAF running for the full 8 months and discharging back into the lagoon. This would help aerate the lagoon as well as remove significant amount of BOD to achieve discharge requirements easily by the annual discharge date. Wyman's could either discharge earlier in the year, or over a smaller discharge area saving on the cost of irrigation equipment.

This testing has shown that the REGEN BAF can be used to supplement existing under performing lagoons. The REGEN BAF can be operated in one of two ways. (1) Placed as a polishing step at the effluent of a lagoon to treat the effluent contaminants to below discharge limits, or (2) can be used in par al ell to the lagoon to recirculate partially treated, aerated wastewater back into the lagoon to help reduce the load and increase the processing capacity of the lagoon.

This is a modular, easily installed, cost effective solution for upgrading existing under performing wastewater lagoon systems.