Mixing To Enhance Facultative Lagoon Treatment

**PRIMARY CELL INFLUENT:** Raw sewage with high carbon BOD (CBOD), high nitrogen, and high phosphorus.

**SOLUTION:** Add SolarBee® GridBee® mixing to enhance the facultative process.

**RESULTS:** SolarBee® & GridBee® mixers are installed to circulate the top 50% of the lagoon. These mixers can capture up to 400 lbs of DO per acre per day which would have otherwise been lost to the atmosphere. The more DO mixed deeper into the pond, the more DO available for BOD-reducing bacteria to use. Influent short-circuiting is minimized or stopped altogether (depending on system design).

A thick well-mixed oxygenated layer continuously destroys any hydrogen sulfide (H2S) odors bubbling up from the bottom turning them to sulfate and resulting in durable odor elimination.

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**WASTEWATER LAGOON SYSTEMS**

In most lagoons, sunlight causes a hard stratification at 12 to 18 inches of depth. The top water is warmer and thick algae populations are producing supersaturated dissolved oxygen (DO). The DO gasses off at the surface and is not readily available deeper in the pond for use by BOD-reducing bacteria.

Meanwhile new inflow water may be short-circuiting straight across the bottom of the pond. Short-circuiting makes actual detention much less than theoretical detention time. Without proper detention time, the water does not have time to experience a good BOD and ammonia reduction.

SolarBee® & GridBee® wastewater mixers from Medora Corporation can enhance or supplement your existing facultative lagoon system. Effective mixing often reduces effluent algae biochemical oxygen demand (BOD) and total suspended solids (TSS) (to under 10 mg/l) and usually ammonia (N), phosphorus (P), and pH. Better mixing can also help solve problems involving overloading, odors, and sludge buildup.

Major system upgrades can often be avoided by making cost-effective enhancements to the system already in place.

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SECONDARY CELL

ACTION: Add SolarBee® GridBee® mixing to enhance the facultative process.

INFLUENT: Influent composition is usually very low in comparison to the primary cell (only 10% as high of BOD, and less phosphorus and ammonia).

RESULTS: Just as in the primary cell, circulation and beneficial algae growth result in large BOD, N, & P reductions. More & better reduction means less of them are passed to the final cell.

Effective ponds in series compound the beneficial effect. When both the primary and secondary cell achieve a 70% reduction of these nutrients, the amount passed on to the next cell is 30% x 30% = only 9%.

FINAL CELL

ACTION: Add SolarBee® GridBee® mixing to enhance the facultative process.

INFLUENT: The influent has very little BOD (almost none) with reduced phosphorus and ammonia.

RESULTS: The only BOD present are algal cells; however, algal growth is carbon limited and there is not enough to cause permit problems for BOD and TSS. Ponds with SolarBee® GridBee® mixing typically discharge less than 10 mg/l of BOD and TSS which is well under the standard 30 mg/l BOD and 45 mg/l TSS limits most jurisdictions have.

It is worth noting the potential for standard BOD testing to give false high & inaccurate readings due to nitrification. Most lagoon systems should go to CBOD testing to avoid these false high BOD measurements. For more information on false high BOD tests, please go to www.medoracom.com/false-high-BOD

Affordable and effective SolarBee® GridBee® mixing can add real treatment enhancement to your lagoon system. Please feel free to contact us to discuss further how Medora Corporation can help you meet your treatment goals.