

RELIANT Water Technologies

Landlocked, shallow bodies of water such as recreational ponds, irrigation, drinking water and animal waste lagoons have a major problem with flow. The only natural methods of movement in these bodies of water are the slight Coriolis Effect of the earth and wind. Neither of these natural mixing sources is sufficient to allow shallow water bodies to respire and deal with the natural biological degradation of wastes and detritus that eventually form on the bottom. Eventually, external problems will occur – algae begins to form in abundance, odors will emanate from the water due to stagnation, blue-green cyanobacteria will form on the surface and cause more odor and toxicity, and eventually the water is no longer capable of supporting basic aquatic fauna reproduction.

Concentrated Animal Feed Operations (CAFO) also use ponds and lagoons to deal with animal wastes and often use the nutrients in these lagoons to spray on fields or row crops which are grown as feed for the animals. Without flow, or water movement in these CAFO lagoons, odors are so high they become a burden to the surrounding area, and the necessary nutrients for the spray fields and mobile sprayers are hard to distribute because of nutrient inconsistencies and/or solids which have a tendency to clog spray nozzle devices.

There are two methods that are available today to assist these water bodies in developing the necessary water movement to address these issues –

1. Mechanical mixing devices that utilize the out-drives of farm equipment that can be used to mix a body of water periodically at the time of nutrient retrieval. Because it requires the time and effort of mixing each time nutrients are required it is slow and time consuming
2. Surface aerators provide a horizontal mix and can affect the amount of mixing required, if enough units with a sufficient amount of horsepower are used. Again, the problem is the number of units required and the cost of the horsepower.

And maintenance on these manmade devices only adds to the costs of operations.

Ten years ago **Reliant Water Technologies** began the development of a unique sub-surface aerator for the municipal and industrial wastewater lagoon industry. This aerator is called a **LAGOON MASTER Sludge Activating Aerator**. Because these lagoons have continuous wastewater inlet flows, the water must eventually be released to the surrounding environment, and the water quality of the effluent waters from the lagoons are regulated by state and federal environmental authorities. Unlike surface aerators, the **LAGOON MASTER** utilizes a simple airlift to begin moving water along the bottom of the lagoon at very slow speeds, and utilizing very little energy. The water is also aerated, so, the moving water lifts the bottom waste solids (sludge) about 8 to 10 inches and introduces dissolved oxygen (DO) in order to induce aerobic microbial digestion of the organic waste solids. The bottom moving water flow causes a vertical mix of the water column that assists in the oxidation of the microbial waste gases returning

back to the environment. The end result, besides cleaner water, that always meets government environmental effluent compliance requirements, is a lagoon where –

- Odors never occur.
- Algae populations are reduced.
- Never experiences seasonal turnover in northern latitudes.
- Complete de-stratification of the water column.
- Sludge reduction is continual so the need to dredge and dispose of waste organic sludge is no longer required.
- Eliminates trapped nitrogen and ammonia gases.
- Requires an mixer only every 12 acre feet of water (acres x depth in feet).
- Saves 80 to 90 percent of the energy of surface aerators and mixers
- Maintenance costs are reduced 90%.

In 2016 it became apparent to Reliant Water engineers that another model of the **LAGOON MASTER** was needed. CAFO, irrigation and spray-field lagoons do not require dissolved oxygen, because their function is to retain the nutrients in the water. Drinking water intake lagoons require algae reduction to save chemicals. What they require is mixing which is consistent and controllable, and a way to eliminate odors, stagnation and toxic cyanobacteria blooms. The **LAGOON COMMANDER** is a modification of the **LAGOON MASTER**. The aeration blower is not required, and because the underwater stress of containing and distributing the aeration bubbles is no longer a need, the **COMMANDER** has a minimum of 50% more water moving energy than the **LAGOON MASTER**. So, fewer units will be required with lower horsepower as well.

Now, focusing on the specific needs of irrigation, drinking water, spray-field and CAFO lagoons, the primary advantages of the **COMMANDER** will be –

1. The constant mixing of the liquids from top to bottom of the lagoon will release the free and uncombined gases that are free of the nitrogen cycle.
2. In CAFO lagoon and irrigation lagoon systems the inorganic nitrogen that is still in a combined state is what is desired for nutrient withdrawal for replenishment purposes of row crops and hay fields.
3. Irrigation water intake locations can be identified where detritus and animal residue (hairs/filaments) aren't found.
4. Odor will be eliminated over 90% because of the release of gaseous elemental nitrogen that will be driven off through oxidation due to the continuous vertical movement of the water.
5. In clear water irrigation and drinking water intake lagoons algae populations will be thinned to the point that filtering and chemicals can be reduced.
6. Seasonal turnover is eliminated.

For more information about Reliant Water Technologies, the Lagoon Master Sludge Activating Aerator or the Lagoon Commander Mixer, contact Jim Dartez at 504-444-2200, jdartez@reliantwater.us.com, or visit our Website at www.reliantwater.us.com.