

BiOWiSH™ Manure and Odor - Beef & Dairy

Manure Lagoon Treatment at Leppington Pastoral Co., Australia

How one of Australia's largest dairies transformed its effluent ponds to totally crust-free and improved farm management, reducing the impact of recycled effluent.

Background

Established in 1951, the Leppington Pastoral Company (Leppington) is a 2,000-cow dairy farm located in Bringelly, west of Sydney, in the Australian state of New South Wales. It has one of the largest dairy farm operations in Australia with integrated production of feed crops and organic fertilizers.

The owners of Leppington, led by Director Michael Perich, had been searching for a effective solution to help manage solid and liquid waste resulting from its intensive dairy production. Their on-farm effluent management system consists of solids screening and a series of three effluent ponds. Biologically treated wastewater in the second and third ponds are recycled within the farm. Approximately two and a half mega-liters of recycled wastewater are used to flush the dairy feed pads on a daily basis. Other recycled water is also used to irrigate 200 hectares of crops and pastures.



Leppington dairy feed pads (front) and milking shed (center rear)



The primary pond receiving newly streamed effluent

Crust Formation

The formation of crust on the manure lagoon surface had been a persistent problem for farm management. The crust creates a sealing effect which prevents natural aeration and contributes to an unbalanced anaerobic state in the manure lagoon. Crusting also intensifies odors and creates a breeding ground for flies and ultimately disease. For the lagoon system to work efficiently, the crust had to be removed mechanically on a regular basis.

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- Accelerates the decomposition of organic waste (sludge)
- Reduces the need for pump outs
- Removes rather than masks odors
- Reduces Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) by up to 80%
- Improves nutrient availability if effluent is used to irrigate pasture
- 100% natural and non-toxic

Available Sizes

- 100g/3.5oz
- 1kg/2.2lb
- 5kg/11lb
- 10kg/22lb





Satellite image of manure lagoon system with visible crust formation on the surface of Lagoon 1

Suspended Solids & Sludge Buildup

The manure lagoon had also been prone to suspended solids and accumulated bottom sludge which can cause the lagoon to become inoperable and creates the need for agitation and pump-outs. These procedures are costly and time consuming.



Separated solids area



Solids screening in progress

Managing Nutrient Levels

The management of nutrients released by farms has been an ongoing concern for the industry and government due to its impact on groundwater and receiving surface waters such as rivers, streams, lakes and even oceans. Elevated levels of nutrient contribute to excess growth of aquatic weeds, algal blooms and slimes, reduced habitat for fish and aquatic fauna, as well as the reduced ability of these bodies of water to deal with other stresses.

Biologically-treated wastewater from the Leppington effluent ponds is used to irrigate nearby surrounding crops and pastures on the farm which is located within the Nepean/Hawkesbury River catchment. This area registers high levels of nutrient in creeks and drainage lines.

The Australian Federal Government has developed a program to rehabilitate the river system by helping reduce the amount of nitrogen and phosphorous being discharged by farms.



The tertiary storage pond is used for washing feed pads and irrigation

Solution

BiOWiSH Technologies approached Leppington Director Michael Perich with a proposal to significantly reduce suspended solids, sludge buildup and nutrient levels in the lagoons by adopting the revolutionary BiOWiSH™ technology.

The proposal also aimed to reduce excessive odor emissions from the lagoons.



Feeding in progress at the dairy pads

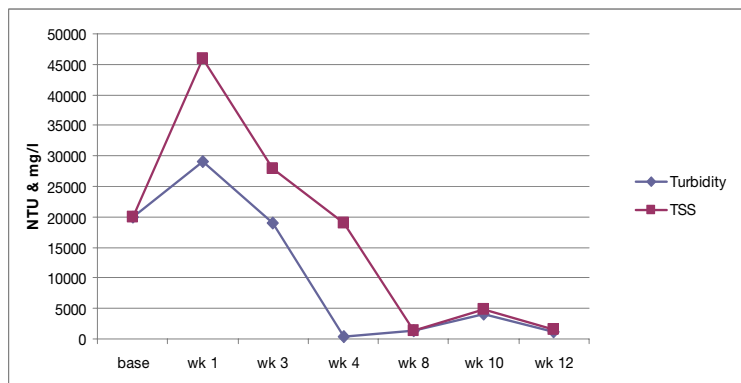
Results

Significant reduction in TSS & Sludge

Shortly after the adoption of BiOWiSH™, small bubbles of gas were visible from the pond surface and an initial spike in turbidity and total suspended solids (TSS) was recorded. This is typical of the new BiOWiSH™ biology that rapidly oxidizes organic waste, reactivating organic sludge sitting at the bottom of the pond and bringing it back into suspension.

By the end of week 12, turbidity and TSS in the primary effluent pond had been drastically cut by 94% and 92%, respectively.

Turbidity & TSS (Lagoon 1)



No more crusting

Before the start of the project, severe crusting on the pond surface had required regular mechanical excavation, costing a lot of time and money for the farm owners. Since the adoption of BiOWiSH™ the effluent pond has now been totally free of crust even when solids screening is not in operation. The removal of the crust also led to a noticeable reduction in odor within the farm.

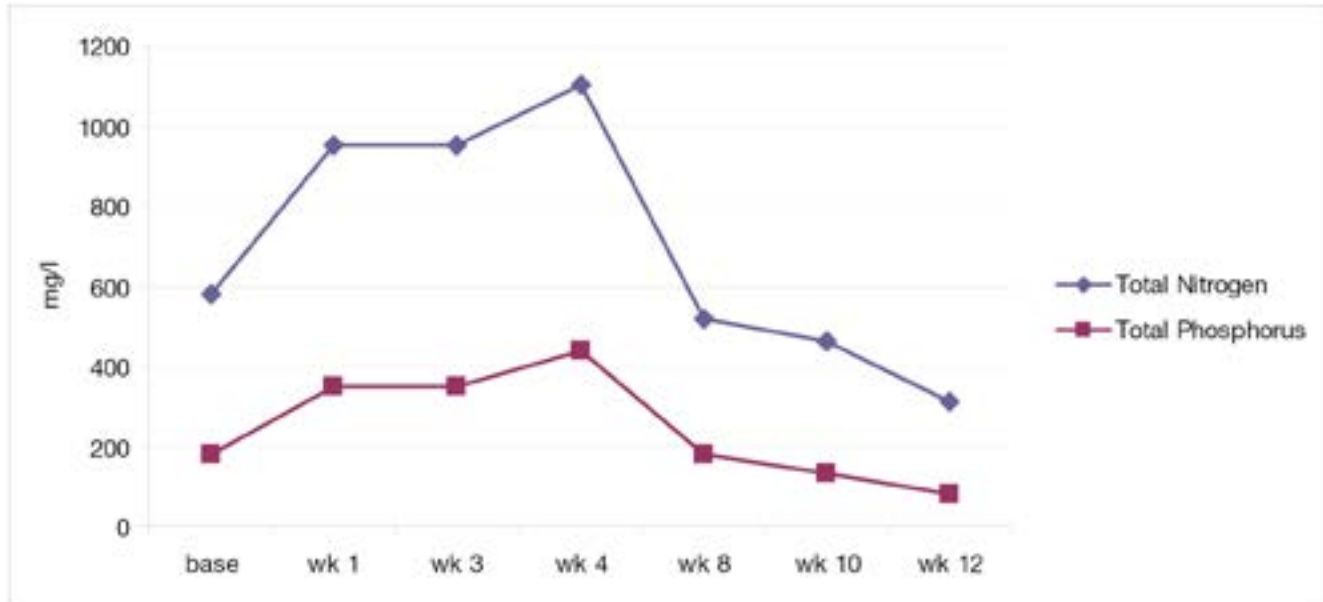
“Nutrient levels in all three ponds have dropped dramatically. So too has crusting. The reduction in solids, particularly in the first pond, will be a significant cost saving to this enterprise. Previously, de-sludging was carried out every one and a half to two years and it was an expensive process. It now seems likely that de-sludging will not be required in the future”.

- Ashley Senn, Team Leader of Nutrient Smart Farms and District Agronomist NSW Dept Primary Industries

Lower nutrient levels

The new BiOWiSH™ biology had also accelerated the removal of nutrients in all three lagoons on site. Testing conducted on the secondary and tertiary lagoons used to recycle water for irrigation had revealed significantly lower nutrient levels by end of week 12. Total Nitrogen (TKN) in the secondary and tertiary lagoons had dropped by up to 47%, whilst Total Phosphorus (TP) had dropped by up to 54%.

TKN & TP (Lagoon 2)



Conclusion

By accelerating the digestion of waste, BiOWiSH™ transformed the Leppington manure lagoon to a crust-free state and reduced the ecological impact of its nutrient discharge. These results were achieved without any additional capital investment.

BiOWiSH™ is truly a breakthrough technology: significantly improving a manure lagoon's efficiency whilst adapting to any existing farm infrastructure.

Testimonials

"Thanks to BiOWiSH our manure lagoon is now more active and able to turnover wastewater more efficiently."

- Michael Perich, Director, Leppington Pastoral Company



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Contact us:

Tel: +1 312 572 6700

Fax: +1 312 572 6710

Email: animalag@biowishtech.com

Web: biowishtech.com

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