

## BiOWiSH® Aqua

### Significant Capital Avoidance in a Municipal Wastewater Treatment System, Barranquilla, Colombia

#### Executive Summary

The City of Barranquilla, Colombia embarked on a project to improve the quality of their municipal wastewater treatment program. Barranquilla has a population of 1.3 million people and, like many cities in developing nations, uses basic wastewater treatment systems.

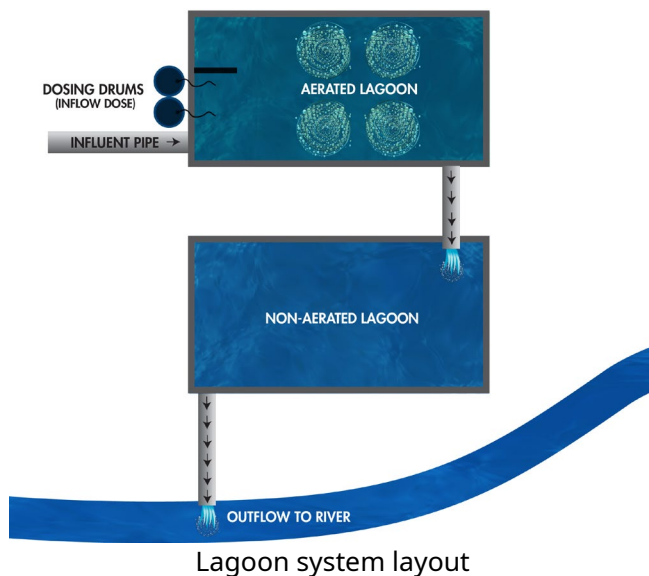
The effluent at the facility in Barranquilla consists of household and industrial discharge, which was noted to be sporadic in flow and strength. The effluent flows from source locations to minor aqueducts, into a series of lagoons, and is then discharged to the Magdalena River.

The City of Barranquilla approached BiOWiSH Technologies for a solution to an ongoing issue: their effluent did not meet discharge requirements and was becoming a serious environmental issue for local municipalities.

#### Objectives

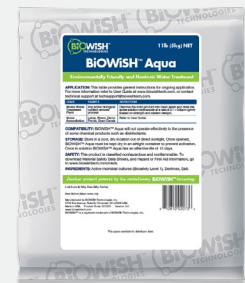
Working in conjunction with Bioprocesos S.A., a local, independent treatment consultant, a BiOWiSH® treatment plan was put together to:

- Eliminate capital investment requirements for utilities expansion
- Reduce hydraulic loading and maintenance
- Reduce odor
- Improve or meet environmental compliance, therefore improving human health
- Reduce existing chemical treatment
- Review the processes used for sustainability and safety for the public



Lagoon system layout

#### BiOWiSH® Aqua



- Rapid nitrification and denitrification in aerobic and anaerobic conditions
- Reduces sludge production
- Increases plant treatment capacity
- Reduces odors
- Reduces aeration requirements
- Reduces need for chemical additives
- Improves plant stability
- Pre-treats influent in collection systems
- Natural and non-toxic

#### Available Sizes

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

## Solution

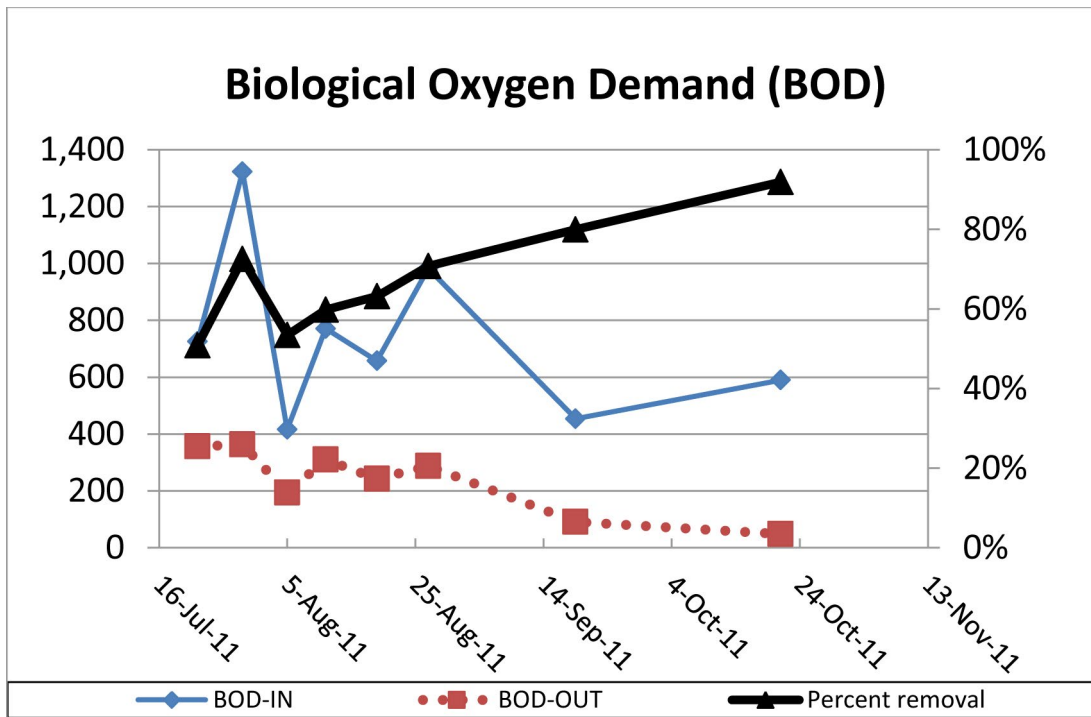
BiOWiSH® Aqua was identified as a treatment strategy that could meet the stated goals. BiOWiSH® Aqua is a novel consortium of biologically active ingredients consisting of extracellular co-factors, enzymes and microbial components. The product acts to reduce odor, volatile organic compounds (VOC), chemical oxygen demand (COD), biological oxygen demand (BOD), and total suspended solids (TSS). A further benefit of the product is that it is 100% biodegradable, certified organic and non-toxic to the environment.

The BiOWiSH Environment team and Bioprocesos S.A. applied BiOWiSH® Aqua to the existing plant structure with the goal of accelerating the biological removal of nutrients from wastewater. BiOWiSH® also reduces the dependency of wastewater treatment plants on biomass (and the inherent maintenance challenges). The team identified the best practices for optimal efficacy and environmental remediation, elimination of excessive product handling, and distribution.

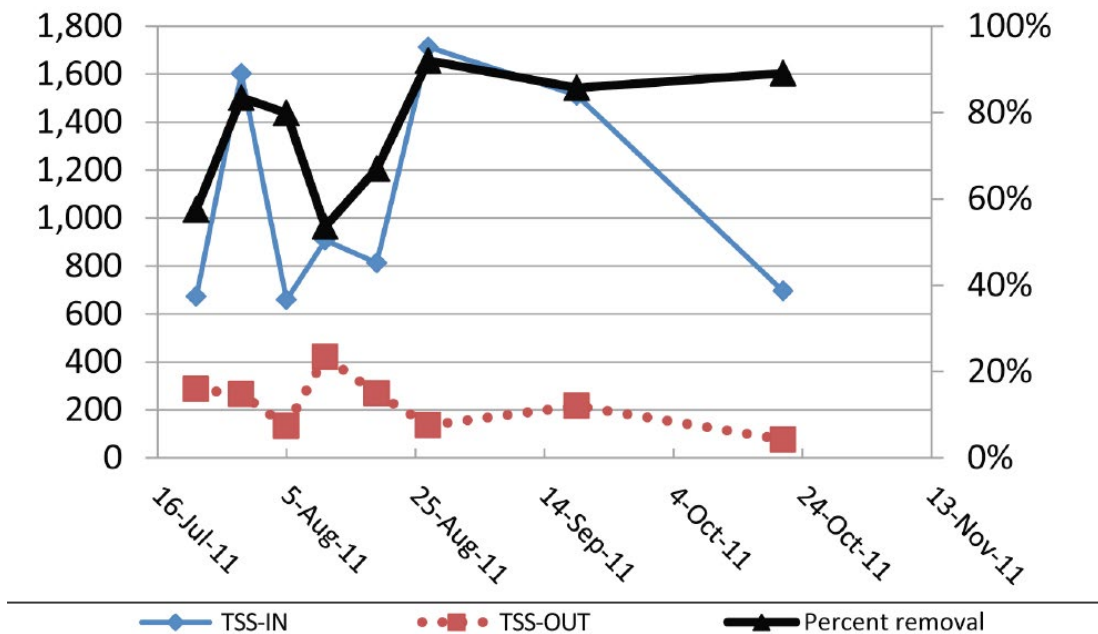
## Results

Total solids loading was reduced almost immediately with a 50% reduction of BOD and TSS. Reduction in hydraulic loading improved the through-put capacity and minimized "bottlenecking," which can result in system upsets requiring additional manpower and maintenance. Such upsets also cause odor issues from VOCs, which are known to lead to health-related issues if experienced for sustained periods. These odors were also eliminated.

With the additional improvement in water clarity and solids reduction, the city was able to perform its wastewater treatment duties without the substantial capital expenditure required to expand municipal treatment infrastructure, a cost estimated to be USD 20M.



## Total Suspended Solids (TSS)



### Conclusion

Non-conventional implementation of the environmentally sustainable BiOWiSH® Aqua product resulted in a cost effective win for the City of Barranquilla Municipal Wastewater Treatment Facility (WWTF). The quality results enabled cost avoidance in excess of USD 20M, and significantly improved the environmental footprint of the wastewater stream.

The technology is relatively simple and quick to implement as compared to traditional systems. The product is safe to use and requires no specialized training or costly dosing platforms.

BiOWiSH® also requires very low energy input. In comparison, traditional systems use lots of energy, notably electricity, which a significant source of greenhouse gas emissions (CO<sub>2</sub>).

Despite loading conditions that pushed the system's capacity to handle treatment from a mechanical and chemical perspective, the City of Barranquilla WWTF, Bioprocesos S.A., and the BiOWiSH Environmental Team worked together to implement a novel bioaugmentation solution.

BiOWiSH® technology offers a realistic and cost effective waste water treatment solution to emerging markets that simply cannot afford a high capital approach.



Before



After



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