

BiOWiSH® Odor

Biological Treatment Helps Alturas Wastewater Treatment Plant Reduce Odor and Improve Effluent Quality, California, USA

Executive Summary

The City of Alturas wastewater treatment plant (Alturas WWTP) initiated a field trial of BiOWiSH® Odor to reduce sludge generation from their anaerobic digester and to eliminate odors from sludge drying beds. Prior to the application of BiOWiSH®, the Alturas WWTP was generating a significant amount of sludge, contributing to a higher frequency of sludge return and resulting in considerable cost of operation. In addition, the sludge from the digester going to the sludge drying beds was causing odor problems. Over a period of five months, the application of BiOWiSH® reduced sludge in the system by over 87%, calculated based on volume of total suspended solids. The sludge return rate was also significantly reduced and the operators reported a complete elimination of odors, contributing to improved safety and air quality from the operation.

Background

The Alturas wastewater treatment plant is located in Modoc County, California, USA. It owns and operates a wastewater collection, treatment and disposal system of 0.5 MGD capacity. The Alturas WWTP discharges the treated effluent to the Pit River at a point downstream from the North and South Forks.

The WWTP was upgraded gradually to comply with the discharge limit. The treatment process consists of influent screening, primary clarification, trickling filters, secondary clarification, disinfection, anaerobic digester and sludge drying beds. Recommended standards from California Department of Health Services on treated municipal wastewater are met by the plant.

There are no industrial contributors to the wastewater collection and treatment system. Mainly residential facilities discharge sewage to this tertiary WWTP, which includes an activated sludge system followed by disinfection using chlorination. The system operates well but generates excess amounts of sludge. The sludge generated is treated in an anaerobic digester on site. It is critical for the wastewater treatment plant to control the amount of solids sludge generated on site.

System details:

- Service area population: Approximately 3000 capita
- Collection system type: 100% separated sanitary sewer
- Method of operation: Tertiary wastewater treatment
- Design flow: 500,000 gallons/day
- Effluent discharged to the Pit River after sanitation

Objectives

The Alturas WWTP was experiencing significant sludge generation and associated treatment costs. Additionally, it was experiencing significant odor issues during the treatment process from the anaerobic digester to sludge drying beds.

BiOWiSH® Odor



- Removes rather than masks odors
- Fast acting
- Effective on a wide range of volatile organic compounds (VOC)
- Cost effective
- Operative at low dosage rates
- Long residual effective period
- Natural and non-toxic

Available Sizes

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

Given these issues, a full-scale BiOWiSH® field trial was conducted with following objectives in mind:

- Reduce organic solids/sludge system wide, from the digester to the sludge drying beds
- Reduce odors from sludge drying beds
- Cut costs associated with sludge pump out requirements and recycling

Solution

BiOWiSH® Odor was used to enhance the performance of the anaerobic digester and control odors emitting from sludge drying beds.

Implementation Program

Mr. Wyatt Troxel and Mr. Pat McCaffrey led the technology roll-out at the Alturas WWTP. BiOWiSH® Odor was dosed to the anaerobic digester and to the sludge drying beds for odor control. Dosing was decided based on the flow rate and BOD load in the digester. Dosing of the product on sludge drying beds was decided based on anecdotal observations. For product activation, four 55 gallon drums were used. The activation period for BiOWiSH® Odor was kept at 24 hours for shock dose and daily dose with ambient temperature. The concentration of BiOWiSH® Odor for per-activating a dose was roughly 5000 mg/L. After 24 hours of activation, the prepared dose was stirred to mix well and then applied to the inflow in the digester and sprayed over the drying beds. For shock dosing, it was made sure that the doses applied evenly across the surface of drying beds as much as possible. Daily doses were applied gradually using up to 24 hours for a dose. Additionally, two separate vessels for mixing the dosage were used; this way, a dose is activated for 24 hours, then slowly fed into the inflow over the next 24 hours while the next dose was prepared in the other vessel.

Data tracking of the parameters (BOD, TSS and ammonia) discussed earlier was performed every week to measure the progress of BiOWiSH® technology in meeting the key objectives. For the anaerobic digester, a dosage of 0.1 kg was applied every day which made BiOWiSH® concentration of 4.8 ppm in the digester. For drying beds, initially a 1 kg dosage was applied for a week, 0.5 kg for next two weeks and 0.2 kg thereafter.

Results

Performance of anaerobic digester

Over a period of five months, the facility experienced an average of 87% reduction in total sludge volume in the digester as shown in Figure 1. Total suspended solids (TSS) concentration in the digester was found to decrease dramatically with BiOWiSH® Odor. Before BiOWiSH® dosing, total suspended solids of about 5500-6000 mg/L were consistently reported in the digester. When BiOWiSH® was added to the digester, the total suspended solids concentration decreased from 5734 mg/L to 1356 mg/L in two weeks, as shown in Figure 1. Reduction in total suspended solids was found to decrease continuously and, after about a month of BiOWiSH® addition, a total suspended solids concentration of 478 mg/L was reported.

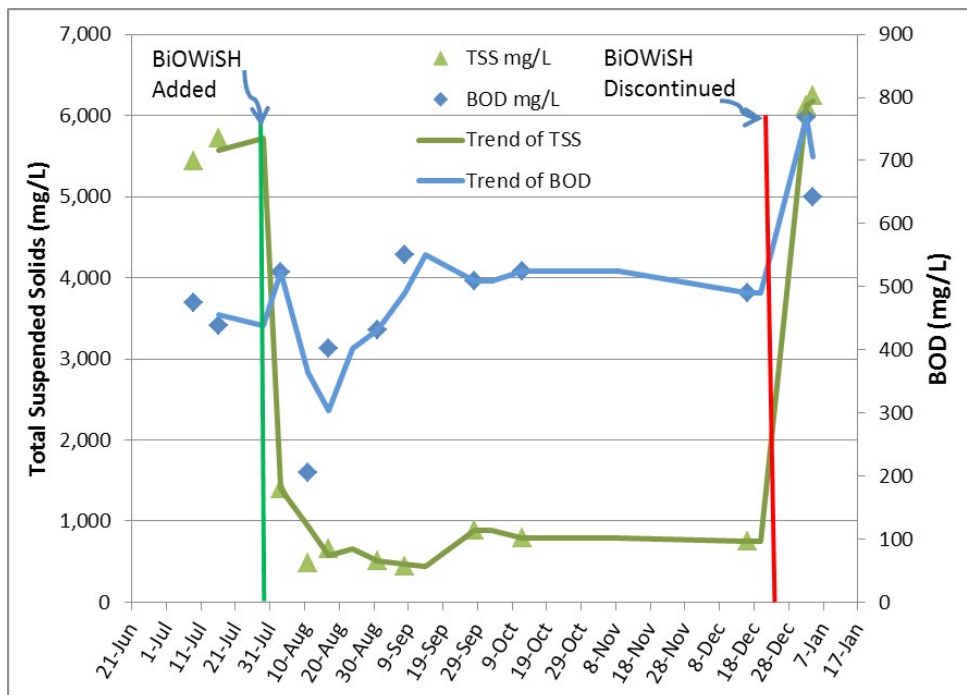


Figure 1. Performance of the anaerobic digester in terms of BOD and TSS

As shown in Figure 1, although the total suspended solids concentration was decreased considerably, there was no change in BOD concentration. This is an indication of biological activity in the form of enzymatic conversion because BiOWiSH® contains mainly enzymes, cofactors and nutrients. The amount of solids reduction was due to three factors: decreased biosolids growth rate, enhanced sludge digestion in the digester, and improved settling during the sludge decant stage. Therefore, it can be concluded that BiOWiSH® Odor achieves the same BOD discharge while reducing sludge concentrations. Frequency of sludge return in the digester and to the drying beds also decreased, resulting in operational cost savings.

Performance with sludge drying beds

BiOWiSH® Odor was added in the system on the way from the digester to the drying bed where odor was a major problem.

BiOWiSH® gave excellent results by completely eliminating the odor, achieved by applying 200 g of BiOWiSH® directly to the drying bed once a week.

Conclusion

BiOWiSH® Odor was found to be very effective in meeting all the objectives, acting as powerful biocatalyst to maintain biological transformation of the influent BOD in the anaerobic digester and reducing sludge volume. A significant reduction in sludge generation was noted and sludge wasting frequency was reduced. The plant operators have confirmed complete odor elimination on the site which has increased the plant safety as well as air pollution.

BiOWiSH® Odor has been successful in similar applications and has demonstrated a significant track history of bioaugmentation around the world. It has proven records of benefit in reductions in solids, BOD reductions and sludge bulking issues. It not only improves the efficiency of anaerobic treatment system but also helps eliminate persistent odor causing compounds due to its powerful capabilities as a biocatalyst.

Testimonial

"I am very impressed with the product used in the digester as well as on the drying beds. I am happy that there are no odor problems on site."

-Pat McCaffrey, Plant In-Charge at Alturas WWTP



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