Case Study

Medora Corporation

Wastewater Treatment Plant

USCAWW-LOC242.001

Topics: facultative, odor control, sludge, energy savings, sludge reduction, MLS/TSS

One of the SolarBee units circulating a wastewater pond.

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Overview: This is a municipal wastewater treatment facility (WWTF) that serves the city. The wastewater system consists of 7 facultative ponds with initial biochemical oxygen demand (BOD) of about 550 mg/L and a continuous discharge rate of 2.8 MGD. Pond 1 is 85 acres in surface area with an average operating depth of 6 ft. Pond 7 covers 70 acres with an average 6ft depth.

Conditions / Objectives: Primary objective of Phase 1 is to improve the treatment process of one set of ponds, with the ultimate goal of expanding treatment capacity. The problems to solve are short-circuiting, periodically low dissolved oxygen (DO) concentrations, inconsistent BOD reductions, sludge accumulation and odors.

Solution: Three (3) SB5000v12 and eight (8) SB10000v12 units into Pond 1, and nine (9) SB5000v12 units into Pond 7. Deployment Date: April 2008

Results: Prior to deploying the SolarBees, the City's WWTF's facultative pond system was operating close to its permitted capacity. The City needed to expand plant treatment capacity without adding lagoon acreage or reducing treatment capabilities. Rather than build an activated sludge treatment plant, the City chose a 2-phase project using solar-powered circulation to replace the future need for an estimated 587 hp of aeration to accommodate increasing influent loading. As part of Phase 1, SolarBees were deployed in 2 of the 7 treatment ponds. Independent project evaluations indicate that the SolarBees have reliably and consistently operated according to their specifications and design parameters, and are meeting Project objectives. The 2 SolarBee ponds are less stratified, cooler, and show significantly better DO profiles than the control ponds. Higher DO concentrations in deeper waters should facilitate the digestion of sludge and slurry accumulated over 30 years. The City anticipates better BOD, CBOD and TSS reductions over time as sludge processing through SolarBee-induced enhanced oxidation continues. Furthermore, Pond 7 now performs very well, with independent CBOD test results showing influent waters of 170 mg/L CBOD being discharged at "non-detect" levels, outstanding for a large pond-based municipal system with heavy industrial loadings. Actual energy savings were calculated to be 25% of 587 hp, equivalent to a total of 146.8 hp motors running 24 hours per day, every day. Based on these results, the CalPOP Wastewater Optimization Program funded by Pacific Gas & Electric provided an incentive payment of $105,548, or about 12% of the total cost for Phase 1, under their Savings By Design for facultative ponds. The CalPOP audit report showed a 7.2-year payback based on energy savings alone, without including capital costs to purchase and install grid-powered aeration. The City is very happy with the results of Phase 1, and plans to continue with Phase 2 (i.e., deploying SolarBees in the remaining 5 ponds) as funding becomes available.