

OXIGEST® Polishes Beverage Waste Streams to Strict Effluent Levels



Application: Beverage Processing

S&L Equipment: Model R OXIGEST®

When a Fortune 500 fruit juice producer sought to meet stringent permit levels for its wastewater discharge at its Michigan processing facility, they specified the high-rate Smith & Loveless **Model R OXIGEST®** treatment system as a part of a comprehensive treatment scheme. The permitting called for stringent effluent requirements on the plant's 0.5 MGD high strength waste stream: 4 mg/l BOD, 5 mg/l TSS, 0.5 mg/l ammonia, 0.5 mg/l phosphorus, and 6 mg/l dissolved oxygen. The flow characteristics entering the **OXIGEST®** system are typically around 650 mg/l BOD, 500 mg/l TSS, 70 mg/l TKN and phosphorus varying from 7-20 mg/l.

In order to help meet these requirements, Smith & Loveless designed a custom **OXIGEST®** system which serves as an aerobic polishing step to an anaerobic reactor. The design incorporates single-stage aeration, clarification, post aeration, nitrification, sludge holding, a selector zone, filtration, phosphorus precipitation—all in one tank. Smith & Loveless performed the erection and field coating.

To prevent filamentous bacteria, the flows enters through a selector zone, which mixes with RAS solids in an anoxic environment to yield short periods of low dissolved oxygen. Next, the aeration zone includes state-of-the-art air diffusion equipment for efficient oxygen transfer, effective mixing and minimal energy usage. The diffuser grids can be adjusted within the aeration zone to optimize treatment. The zone also contains integral instrumentation for process monitoring of pH, dissolved oxygen, mixed liquor suspended solids (MLSS), and temperature levels, which allows the system's operator to easily control the plant from a remote operations room or on the plant bridge.

Following aeration, the flow encounters a specially-designed flocculating clarifier, which includes a 7,000 gallon floc zone to improve distribution of the flow in the settling zone of the clarifier. The effluent from the clarifier encounters an integral dual media filter for further reduction of BOD and TSS. The filter also aids in reducing the TKN associated with the effluent biological solids. A post-aeration zone raises the dissolved oxygen level to provide effluent level of 6 mg/l. Chemical feed precipitates phosphorous



This OXIGEST® helps meet the juice processor's stringent permit levels.



Project Profile

Avg. Flow:	0.5 MGD / 1900 cmd
Influent:	650 mg/l BOD / 500 mg/L TSS, 70 mg/l TKN / Up to 20 mg/l Phos.
Effluent Reqs.:	4 mg/l BOD / 5 mg/L TSS, 0.5 mg/l Ammonia / 0.5 mg/l Phos.
Plant Diameter:	124' / 38 m

while supplying alkalinity as necessary to maintain the pH level. A sludge storage zone (capacity of 115,000 gallons) sufficiently handles sludge generated during BOD removal for about seven days with a concentration of 2%.

Space efficiency in its footprint is another key feature of the design, preserving precious facility land for other plant operations. Circular steel tankage is also the most durable package design for retaining large volumes of wastewater while minimizing the use of steel raw material cost. In colder climates like Michigan, the all-encompassing **OXIGEST®** tankage minimizes the surface area exposure to the elements, which saves heat and protects the biological operation. Additionally, the design eliminates external pipes, pumps, and service walkways. Because of this, the **OXIGEST®** kept the overall project under budget.