Headworks® INTERNATIONAL

CASE STUDY: High Liner Fishery Products DANVERS, MASSACHUSETTS. USA

MBBR Eliminates Odor Problems While Reaching Effluent Targets at Fish Processing Plant

Customer: High Liner Fishery Products
Industry: Industrial,Food & Beverage

Background

Based in Danvers, Massachusetts, High Liner Fishery Products is a leading supplier of quality fresh and frozen seafood products. High Liner Fishery Products has more than 150 value-added fish and shrimp products, such as: cod, flounder, salmon, tilapia, and lobster. With value-added production facilities in both Massachusetts and Newfoundland and a major distribution center in Massachusetts, High Liner Fishery Products boasts the most seafood processing technology and distribution capabilities in the industry.

Challenge

High Liner's fish processing plant was experiencing challenges with their existing wastewater treatment system, based on conventional trickling filter technology. The plant was generating a myriad of problems, including: plugging, flies, and even odor complaints from neighboring residents.

Fish smells aren't popular, especially smells from a fish processing plant. Management knew they had to take action, so they began to search for an alternative treatment technology. The new treatment system would not only have to eliminate the existing problems, it also needed to be expandable, fit within the old plant's footprint, and be simple to operate. To complicate matters more, the nature of the business required that the processing plant operate 350 days/year with a two week shutdown in July. Accordingly, the new system would have to be installed within a very tight two week window.

KEY FACTS

- **Wastewater Flow:** 272.5 m^3/day (72,000 GPD)
- **BOD_5:** Design Influent < 1500 mg/L
  Effluent Req. < 250 mg/L
- **Total Suspended Solids:** Design Influent < 100 mg/L
  Effluent Req. < 250 mg/L
- **FOG:** Effluent Req. < 100 mg/L
- **Temperature:** < 30 °C (86 °F)
- **pH:** 6.5 – 8.0

"The ability to treat our wastewater without odor generation was the main challenge that we faced with this project. Headworks BIO has met and exceeded all of our goals and discharge limits. Everyone is breathing much easier now, including our neighbors."

- Frank Gochakowski, Jr. Operation Supervisor, High Liner Fishery Products

ActiveCell Solution

Based on the plant's requirements, Headworks BIO™ Inc. proposed that the plant install a moving bed biofilm reactor (MBBR). The MBBR system would fit within the existing footprint, meet effluent requirements, reduce orders, and be straightforward to operate.

Wastewater from the facility flows by gravity from floor drains and rotary screens to a below grade wastewater collection tank. The wastewater is then pumped to a 40,000 gallon equalization (EQ) tank that is continuously agitated with a PD Blower and an air sparging system. The process stream is pumped at a controlled rate to a pre-dissolved air flotation (DAF) system where total suspended solids (TSS) as well as fats, oils, and grease (FOG) are flocculated, coagulated and separated. The clarified wastewater is then directed to a 3,000 gallon collection pump and transferred to the MBBR treatment system by flow controlled transfer pumps. Suspended solids removed by the DAF system are pumped to a sludge holding tank for pick-up by a rendering operation.

Clarified wastewater is then biologically treated by the MBBR process incorporating two 10,000 gallon ActiveCell® bioreactor tanks operating in parallel configuration. The ActiveCell process biodegrades wastewater using thousands of suspended plastic pieces of media that operate in a continuously mixed, aerated environment. Each piece of media provides an active surface area sustaining heterotrophic and autotrophic bacteria within protected cells. This dynamic population of bacteria achieves high-rate biodegradation productivity within the system, while also offering process resiliency and automated operation.

Inactive microorganisms within the ActiveCell process are continuously sloughed from the media and exit the bioreactors via a wedge wire retaining screen in the form of total suspend solids (TSS) with the treated effluent. This continuous sloughing action exposes the biofilm to the organic load in the wastewater and provides a self-regulated high-rate biological treatment process that is responsive to load fluctuations.

Treated wastewater flows from the ActiveCell system by gravity to a dissolved air flotation (DAF) system located in a climate controlled process control building where total suspended solids (TSS) are removed from the process stream. Solids accumulate on to the surface of the water within the DAF, and a mechanical flight and chain assembly slowly skims the surface of the water to a sludge holding chamber.

Results

Everything was executed as planned and the plant reopened after the brief two week shutdown period. The system was turnkey-installed and began operation soon afterwards. Approximately two weeks following system start-up, the system was already reaching the prescribed effluent quality targets of <550 mg/L BOD_5 and <250 mg/L TSS. System performance has surpassed design criteria, despite varying influent conditions (namely flow and lack of nutrients).

The process stream is pumped at a controlled rate to a pre-dissolved air flotation (DAF) system.