

CASE STUDY

Scaling Wastewater Infrastructure for a Major East Coast Poultry Producer

Project Type: Food & Beverage

Location: East Coast, USA

HIGHLIGHTS

Delivers 271,300 lbs/day of total oxygen to process intensive organic loads for a 5 MGD plant.

Seamlessly operate in both aerated and anoxic cycles using the same equipment design.

Met tight EPA Effluent Limitation Guidelines (ELGs) for nutrient and nitrogen removal.

PRODUCTION EXPANSION MADE EASY

To support a major production expansion, a large East Coast poultry plant upgraded to a 15.2-million-gallon complete-mix activated sludge system utilizing KLa Systems' Slot Injector technology. The advanced configuration effortlessly processes high biological oxygen demand (BOD) and heavy nitrogen loads by decoupling aeration from mixing. This gives operators the precise control and energy-saving turndown capabilities needed to satisfy strict environmental discharge standards while maintaining steady production.

CHALLENGES FACED

- **Tightening Effluent Standards:** Evolving EPA regulations and industry guidelines require meat and poultry facilities to implement more reliable, advanced treatment methods to drastically lower nutrient discharge.
- **Complex Process Control Requirements:** Required aeration systems capable of efficiently supporting alternating nitrification and denitrification cycles without sacrificing process stability.
- **Supporting Production Expansion:** A significant increase in production at the poultry processing plant necessitated an immediate, large-scale expansion and upgrade of existing wastewater infrastructure.



SOLUTIONS IMPLEMENTED

- **Advanced Slot Injector™ Aeration:** Deployed specialized slot-shaped jet aerators in the nitrogen removal stage to maximize gas-liquid contact via high-energy bubble clouds and achieve superior alpha factors compared to alternative technologies.
- **Flexible Oxidic/Anoxic Operation:** Leveraged the Slot Injector system's ability to support both aerated (oxic) and non-aerated (anoxic) operation while maintaining complete basin mixing.
- **Custom Aeration & Pumping Infrastructure:** Installed five 100-hp jet pumps and eight 125-hp blowers for the BOD stage, alongside four 200-hp injector pumps and five 200-hp blowers for the nitrogen stage.
- **Optimized Multistage BNR Configuration:** Five large-scale equalization, nitrification, and denitrification basins were configured with dedicated zones, providing biological nitrogen removal within a compact treatment footprint.
- **Dynamic Oxidic-Anoxic Process Control:** Configured the system with variable frequency drives (VFDs) and DO feedback loop integration, allowing operators to completely turn off airflow for anoxic denitrification while running the injector pumps at reduced speeds to maintain thorough mixing.

OUTCOME AND IMPACT

- **Substantial Infrastructure Expansion:** Successfully commissioned circular nitrogen removal tanks providing 6.4 million gallons of volume, alongside three new equalization tanks providing 8.5 million gallons of volume.
- **Massive, Target-Driven Oxygenation:** Achieved a reliable oxygen transfer capacity of 185,000 lbs/day in the nitrogen removal basins and 86,300 lbs/day in the primary stage to effectively eliminate heavy pollutant loads.
- **Enhanced Energy Efficiency:** Enabled significant utility savings via precise turndown capabilities, allowing the facility to match power consumption directly to fluctuating plant loading conditions without settling issues.
- **Future-Proof Compliance:** The successful upgrade to the facility provides the processing plant with the long-term process resilience needed to satisfy strict nutrient discharge regulations.



The East Coast poultry processing facility successfully expanded its capacity to handle a combined 15.2 million gallons of wastewater. By deploying KLa Systems' Slot Injector technology, the plant decoupled aeration from mixing, giving operators the precise control needed to optimize oxic and anoxic biological cycles on the fly. This seamless upgrade ensures maximum energy efficiency and strict compliance with modern effluent guidelines while maintaining continuous, large-scale industrial operations.

