

CASE STUDY

Rapid Series™ Slot Injector Expands Oxygen Transfer Capacity Without Basin Expansion

Project Type: Food & Beverage

Location: Turlock, CA, USA

HIGHLIGHTS

Adds 8,000 lbs/day of oxygen transfer to a 750,000 gallon nitrification basin — a 25% capacity increase.

Retrofit within existing infrastructure, with no new basin construction and no added treatment footprint.

Rapid installation completed without disrupting ongoing plant operations.

CAPACITY EXPANSION WITHOUT NEW CONSTRUCTION

To support higher production rates, a protein conversion facility in Turlock, CA expanded the oxygen transfer capacity of its existing nitrification basin using KLa Systems' Slot Injector™ technology. Rather than expanding the treatment footprint, the facility added a skid-mounted aerator that dropped directly into the basin it already had — gaining the oxygen needed for a larger production load without new construction, added blower capacity, or downtime. That installation later became the basis for KLa's standardized RS Slot Injector platform.

CHALLENGES FACED

- **Rising Production Demand:** A planned increase in production volume required more wastewater treatment capacity than the existing aeration system could deliver.
- **Fixed Treatment Footprint:** The additional oxygen transfer had to be achieved inside the existing nitrification basin — expanding the treatment footprint or building new basins was not an option.
- **No Tolerance for Downtime:** Any upgrade had to be installed and commissioned without interrupting ongoing plant operations.



SOLUTIONS IMPLEMENTED

- **Slot Injector Modular Series Aeration:** Deployed a Slot Injector Modular Series in the facility's 750,000-gallon circular basin (73 ft diameter, 24 ft depth), delivering high-efficiency oxygen transfer and complete basin mixing from a single system.
- **Phased Capacity Build-Out:** The original 2010 installation placed 64 Slot Injector nozzles, capable of up to 31,000 lbs/day of oxygen transfer. A 2017 expansion added a skid-mounted aerator with 16 additional nozzles to meet the facility's growing load.
- **Self-Contained Aerator Skid:** The expansion package included a 24-hp submersible recirculation pump, with process air supplied by the plant's existing blowers — avoiding the cost and space of new blower capacity.
- **Rapid Retrofit Installation:** Equipment installed directly within the existing reactor infrastructure, requiring no basin modification, no new civil work, and no shutdown of the treatment process.

OUTCOME AND IMPACT

- **25% Increase in Oxygen Transfer Capacity:** The expansion is capable of delivering an additional 8,000 lbs/day of oxygen transfer within the same basin volume.
- **Production Growth Supported:** Increased treatment capability allowed the facility to sustain higher production volumes without a wastewater bottleneck.
- **Zero Plant Disruption:** Rapid installation kept the treatment process and production schedule running throughout the upgrade.
- **Capital Avoided:** Capacity was expanded without new basin construction, sparing the facility the cost, permitting, and schedule of a civil expansion.
- **Reliable Long-Term Performance:** The system continues to deliver dependable aeration and mixing within the existing treatment train.



WHY THE RS SLOT INJECTOR?

The success of the Turlock installation demonstrated clear demand for a more repeatable, rapidly deployable retrofit solution. The RS Slot Injector platform was developed to standardize these installations into a packaged product — one that can be deployed faster and more cost effectively for retrofit and capacity expansion projects at facilities facing the same constraints: more load, the same basin, and no room for downtime.

