

CASE STUDY

EquaJet[®], VariOx[™]
Poultry Processing
Alabama



Secondary clarifier with nitrification and anoxic basins in background

Parkson EquaJet[®] System Treats Poultry Processing Waste at Alabama Facility

Background

A chicken processing plant located in Alabama selected the Parkson EquaJet[®] treatment system to treat production waste from the facility. The EquaJet system treats all production waste generated in the facility which comes from the slaughter step, processing and packaging.

The Challenge

The old treatment scheme at the plant consisted of screening followed by low-rate anaerobic pretreatment, then activated sludge. The activated sludge treatment was split between two systems – a conventional aeration basin with clarifier and a batch treatment process. Both existing activated sludge systems were reaching the point where major repairs would be required in the near future. One issue with the existing plant was the need to clean and replace fine bubble diffuser membranes on a regular basis. This was occurring approximately every 3-5 years and would cause a significant disruption to the operation of the facility. The production facility was also in the middle of expanding production by roughly 20%, which meant more wastewater to treat at the plant.

The Solution

The owner wanted a system that would provide the necessary treatment with more reliability, especially since the plant has a

direct discharge permit. Based on positive results the owner was receiving with their MLE process at another facility in Alabama, they elected to go with a similar solution. The owner previously teamed up with Reid Engineering to design the MLE at their other plant and selected Reid once again to assist with plant design. Based on tight nitrate limits the plant needed to meet, the Parkson EquaJet process was selected. The EquaJet system utilizes the MLE process with one main difference – the nitrate recycle between the nitrification and anoxic basins is done with the same pumps that are used to provide motive liquid to the jet aeration system located in the anoxic basin. This eliminated the need to have a separate pumping station for nitrate recycle, resulting in lower overall power costs and savings on capital and construction costs. The motive recirculation rate for the jet aeration system is higher than what is needed for nitrate recycle, so a flow meter and throttling valves are used to allow the operator to select the portion of jet motive liquid that comes from the anoxic basin versus what is recycled from the nitrification basin. Since the motive recirculation flow for the jet aerators is fixed, higher nitrate recycle rates can be used to improve denitrification without adding power cost. This is done by simply adjusting valves so a higher percentage of jet motive liquid is coming from the nitrification basin.



VariOx Jet Aeration system in nitrification basin

Reliability

Parkson's VariOx™ jet aeration systems were installed in both the anoxic basin and the nitrification basin. Both systems were designed to provide complete mix with or without air from the blowers. This allows the anoxic tank to be mixed in an anoxic condition and also allows for variable air flow based on dissolved oxygen levels to be used in the nitrification basin to prevent over-aeration and optimize power consumption. The jets are constructed of fiberglass reinforced plastic (FRP) and are not subject to wear or degradation. The jet aerators maintain a consistent oxygen transfer efficiency over the life of the system, which can be greater than 25 years. They utilize a combination of motive liquid flow provided by pumps and air flow provided by blowers. All equipment is located outside of the treatment basins so operation and maintenance are easy for the operators with minimal downtime during maintenance. The high oxygen transfer efficiency of the jet aeration systems allowed the owner to re-use the existing blowers that had been used with the old fine bubble diffusers.

The Results

The Parkson EquaJet system was put into operation in October of 2019. The plant is achieving all of the permit limits.



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