

Wastewater Reuse and Reduction Program Improves Efficiency at Chicken Processing Plant

Challenge

When the Food Safety and Inspection Service implemented its Hazard Analysis and Critical Control Point (HACCP) inspection program at this southeastern chicken processing facility, water use increased by approximately two gallons per bird, with a consequent increase in water and wastewater treatment costs. Local sewer and utility costs also were on the rise. The plant was paying 32 cents per pound for Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) over the permissible amount.

Solution

An audit was initiated by GE Water & Process Technologies and plant personnel to find ways to reduce water usage and treatment costs. The following recommendations were made:

- Spray bars can be converted from potable water to post-wastewater treatment water for washing offal from screens.
- Low-pressure nozzles are more efficient for washing and use less water than pipes drilled with holes.
- Water discharged from the third bird wash is relatively clean and can be reused.
- Some water can bypass the wastewater plant and go directly to sewer, thus saving on treatment costs.

Plant efficiency was determined by wastewater analysis:

- 250,000 birds per day @ 8 gallons (30.3 L) per bird = 2 MGD water
- 3,000 ppm (mg/L) of organic material in the wastewater = 50,000 pounds (22,680 kg) of dry weight organic matter

- 50,000 pounds (22,680 kg) converted to live weight = 167,000 pounds (75,750 kg) live chicken weight
- 250,000 birds @ 5 pounds (2.27 kg) = 1,250,000 pounds (561,181 kg) live weight
- $167,000 / 1,250,000$ pounds (75,750 / 561,181 kg) $\times 100 =$ % of live weight in wastewater - 13.4%

Results

The recommendations for water reuse and reduction were implemented, and training was initiated to keep ingredients and products off the floor and out of the drain. Tank overflows were reduced. Maintenance, operating, and cleanup practices were modified. The biggest impact was achieved by using FDA and Generally Recognized as Safe (GRAS) polymers in the wastewater treatment system, enabling the plant to sell the Dissolved Air Flotation (DAF) skimming for rendering and ultimate use as animal feed. Water use was reduced to pre-HACCP usage levels and production efficiency increased by 5%.



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