

GEM Retrofits Two Antiquated DAFs at Turkey Harvesting Facility

The team at one of the world's largest turkey slaughterhouses was facing a challenge. They were facing increased hydraulic loadings in their existing DAF (Dissolved Air Flotation) units, and adding a new wastewater room wasn't an option due to the high cost involved. On top of that, their water conservation efforts led to higher contaminant loading so they need more efficiency than their DAFs could provide. Could they find a way to work around this without having to increase the size of their wastewater building?

Challenge

The client had already reached the full hydraulic capacity of their two existing DAFs and needed a solution to manage present and future needs. Building a new facility to replace the small DAFs with larger DAFs, or adding a third DAF were ruled out as they would have required significant investment. When the client approached CWT with their problem, CWT examined the tanks and determined that they were in good physical condition. CWT proposed that the client allow CWT to retrofit each DAF using CWT's technology. Doing so would increase flow in each DAF from 300 gpm to 600 gpm.

Solution

CWT added one bank of six liquid, solid, gas mixer (LSGM) heads to each existing DAF, removed the floc tubes of the DAFs, and added bloom chambers and air compressors. The client was able to keep up with their growth after this upgrade. CWT also collaborated with the client's existing chemical supplier to ensure that the correct chemical and chemical dosing were used to treat the wastewater cost-effectively.

The plant effluent was pumped to the client's "crusher" pumps, then to their existing equalization (EQ) tank, and then to the client's newly retrofitted DAFs – now a GEM System. This added functionality allowed the client an additional 10-12 years before they had to expand their wastewater room



Figure 1 Original DAFs unable to treat water



Figure 2: GEM System Upgrade

PARAMETER (Average)	INFLUENT	EFFLUENT	PERCENT REDUCTION	PH COAG / CAT / AN
TSS mg/L	1,007	109	88%	7.4 20/10/5
BOD mg/L	570	46	90%	
FOG mg/L	1,976	736	61%	

At maximum treatment, the GEM System can provide up to 100% TSS removal and <5 ppm ("non-detect") of FOG's. Since client's new GEM Systems flowed into a lagoon, client only desired minimal removal rates in the GEM System.

The GEM Concept

The GEM System relies on three main patents to operate effectively. The first patent is based on the entrainment of air into the entire waste stream under pressure, resulting in the formation of large and small bubbles that attract contaminants. The second patent enhances the flow of the waste stream through the LSGM (Liquid Solid Gas Mixing) heads, which regulate mechanical mixing through plugs in the LSGM canisters' ports. This creates a "vortex" effect that pushes larger contaminants to the outside of the LSGM piping at various mixing speeds and energy. The third patent is based on the GEM System's LSGM heads' ability to elongate each chemical compound, increasing the surface area for the contaminant and air bubbles to attach. The solids and liquids are already separated before the stream reaches the GEM tank.



Figure 3: Typical LSGM Retrofit

The result is 20% (or more) drier sludge, 20% higher contaminant removal, and a footprint that is 50 – 90% smaller than conventional separation technologies.

Key Benefits

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|--------------------------------|---------------------------------|
| ▪ Increased capacity | ▪ Maintained existing footprint |
| ▪ Better chemical efficiencies | ▪ Dry sludge |
| ▪ Used existing assets | ▪ Less lagoon maintenance |



Left: Before GEM Treatment
Right: After GEM Treatment

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