



## CASE STUDY

## DAF to GEM RETROFIT - RENDERING

### CHALLENGE

A prominent rendering facility in the southeastern United States was faced with loadings that were too high for the existing dissolved air flotation (DAF) unit. To minimize the amount of carry-over into their secondary system, they were forced to run at a very slow rate. Still, too many solids were being discharged from the existing DAF into the anaerobic pond.



The existing Dissolved Air Flotation (DAF) unit was 30' long by 10' wide by 8' tall and equipped with "serpentine" (aka "floc tube") mixing apparatus. The floc tubes clogged on a regular basis making the existing system inefficient and labor-intensive.

The DAF unit was fairly new and exceeded its 200 gpm capacity significantly. Client determined their flow to be closer to 400 gpm but they had no available space or capital to expand. They needed to research retrofit

options.

### SOLUTION

During their research, a colleague referred them to Clean Water Technology (CWT). The Client learned about the Gas Energy Mixing (GEM) System and how it is the most efficient and modern primary treatment system. How this technology injects air directly into 100% of the waste stream which create smaller bubbles that are more effective at attracting waste particles of varying size. As the waste particles enter the LSGM's, they are subjected to centrifugal force which provides high energy mixing at various pressures in the LSGM (hydrocyclone) heads. As polymer is added to the system at a predetermined rate, the polymers begin to uncoil, creating more surface area to which the waste particles attach. After running through the series of LSGM heads, solids and liquids are already separated. As such, the tank is used only for skimming solids. Using fewer polymers and producing more oxygenated flocs, the GEM System also saves the Client money by producing less and drier sludge.

After comparing the cost and footprint challenges of adding a second DAF to the cost of retrofitting the existing DAF using GEM technology, the Client contracted with CWT for the retrofit. The retrofit called for removal of the existing floc tubes, removal of 6' of baffles, insertion of a bloom chamber (simply a partition in the DAF that allowed the flocs to "pop" to the top once the solids and liquids were separated) and the retrofit to the GEM Technology by adding 2 banks of Liquid Solid Gas Mixers (LSGM).



Two banks of model 300/600 LSGM's were chosen for this application due to varying flows throughout the day. Based upon the level of influent into the LSGM Heads, the second set of heads were provided to initiate when flow is at high/high, based upon level sensors in the

equalization tank. When flow is low, the Client saves energy by only running one bank of LSGM Heads.

Using the existing flotation tank, throughput was calibrated to 400 gpm based upon the Client's needs. From the GEM conversion, the treated effluent flows to the existing anaerobic lagoon into an aerobic lagoon. A portion of the water is used for irrigation while the rest is discharged to the City.

### **EXPANDIBILITY**

The existing GEM retrofit, as is, is expandable to 600 gpm simply by opening up more holes in the LSGM heads. This can be done by Client's operators on site with less than one hour of down time. In addition, the existing "DAF" tank is so large that with the addition of one or two more banks of LSGM heads, Client's could increase their new GEM up to 1,000 gpm.

### **SUMMARY**

To date, the system is running with exemplary results and the site serves as a prime example of how CWT can provide greater capacity and results out of existing DAF units. The CWT retrofit solved the carry-over issue to the secondary treatment lagoons, in addition to the following:

- Increased System Flow Throughput
- Increased Contaminant Loading Capability
- Increased Contaminant Removal Rates
- Decrease Use of Chemical on a Per Gallon Basis
- Decreased Sludge Production with High % Solids Rating (Drier Sludge)

### **HIGHER CONTAMINANT LOADINGS**

As Client become more efficient at conserving water, the contaminant loadings in the water can increase significantly. The LSGM's operate based upon flow ONLY with no increase in size as contaminant loading increases. In other words, whether Client feeds the GEM System 100 ppm of TSS and FOG or 30,000 ppm of TSS and FOG, the newly retrofit GEM System can accommodate the higher loadings with no increase in capital.

### **ECONOMICS**

The DAF to GEM Retrofit now performs more efficiently and has provided the Client with savings on chemical, energy and sludge-related costs. Client's surcharges were substantially decreased and the carry-over of solids going to the secondary treatment process were reduced. The Client was and remains extremely pleased with the retrofit as it enabled easier operation of the secondary treatment process and flexibility for future expansion with no capital expenditures.