



**GEM**  
Gas Energy Mixing By CWT

## CASE STUDY

## MEAT PROCESSING

For over a decade, this meat processor in Iowa has supplied processed meat products of the highest quality both domestically and internationally. Market demand for these quality products has led to extensive expansion of its plants. Presently the company has four state-of-the-art processing facilities, the newest of which is located in Utah.

The company became the first turkey processing plant in the United States to achieve ISO-14001 certification for their commitment to the environment. It was written in their Mission Statement "To operate with concern for the environment and natural resource conservation." Clean Water Technology, Inc. ("CWT") partnered with the company and provided a wastewater treatment solution for their largest facility located in Iowa. CWT has since installed cutting edge wastewater treatment equipment for three of their facilities.

### CHALLENGE

CWT was asked to design for a highly variable stream in terms of total flow. Another challenge was the limited space available for equalization tanks within the wastewater treatment building. The customer needed a unique treatment system that could handle flow ranges from 400 gpm in normal daily processing scenarios and peak flows up to 600 gpm during high flow CIP cycles.

### SOLUTION

**Mechanical Solution:** CWT provided a GEM System Dual 300/750 consisting of a single flotation tank with two influent banks of Liquid Solid Gas Mixers (LSGM). The Dual Bank LSGM system was selected for its adaptability to variable flows. The first bank of LSGM heads stayed in constant use for "normal" flows of 300 gpm, while the 2<sup>nd</sup> bank of LSGM heads were activated by a level sensor when high flows occurred.



The equalization limitation also created a challenge in effectively treating load variances. A system that could adjust "Real Time" to follow TSS, FOG, and COD/BOD fluctuations was required. Since the LSGM technology is based on the "insitu" treatment principal, reaction times from chemical adjustments occur within seconds rather than minutes or hours. This enables the Client to effectively maximize reduction rates allowing the GEM System to accommodate inadequate equalization scenarios.

The dual bank LSGM Controls enable the GEM System to start using one bank of LSGM heads during normal processing situations while a level sensor activates the second LSGM System as the level in the equalization (EQ) tank continues to rise during high flow CIP cycles. This allows the GEM System to process an additional 300 gpm for a total throughput of 600 gpm while conserving energy and creating a more sustainable solution for the customer. By utilizing the GEM System Dual 300/750, the system can adapt to increasing flows as the facility expands.

**TABLE 1: GEM Effectiveness on "Hot Well" Water from Diesel Facility**

PARAMETER	INFLUENT	EFFLUENT	PERCENT REDUCTION
TSS	3,000 ppm	11 ppm	99.6%
COD	4,500 ppm	1,750 ppm	61.1%
FOG	2,500 NTU	16 NTU	99.3%

**Chemical Solution :** To minimize operating costs, CWT's engineers designed a three part chemical regime that consisted of a cationic polyamine, a cationic polyacrylamide, and an anionic



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polyacrylamide. The object of this specific regime allowed the customer to benefit from reduced chemical costs while maintaining optimal contaminant removal rates.

By using a cationic polyamine coagulant to satisfy a portion of the positive charge requirement rather than using 100% of the cationic polyacrylamide, the site was able to reduce ongoing chemical costs to satisfy the positive charge requirement. The coagulants are more economical to use and therefore minimize chemical treatment costs.

This specific chemical solution can be achieved due to the flexibility of that the GEM System provides with its multiple injection point in the LSGM heads. The GEM System is able to uncoil the chemical strands to its maximum without shearing them, giving the customer more efficient chemical usage.

### CONCLUSION

Implementation of the Dual LSGM GEM System combined with the optimal chemical regime allowed this meat processor to meet their design criteria in a small area—that addressed varying flow rates with lower chemical costs. The system was installed quickly and CWT engineers provided on-site startup and operator training.

Results from the GEM System demonstrated removal rates of greater than 95% TSS and FOG, and acceptable BOD/COD results for discharge to the City. In addition, the GEM system produced drier sludge reducing hauling charges and plant labor. Surcharges were reduced and the risk of fines and NOV's in the future for discharge violations were eliminated.

Due to the ability of the GEM system to adjust to increasing flow volumes, the customer did not have to install a large EQ tank which would have greatly increased the overall footprint and installation costs for the entire project. The GEM System will fulfill the flow requirements during the entire plant's planned expansion. There are no further needs to add upgrades or changes at a later date.

### ECONOMICS

**Operations:** The ease of operation eliminated the need for a dedicated operator. Chemical savings of 35% to 45% over other technologies were estimated. In addition, by employing the 2<sup>nd</sup> set of LSGM heads only when needed, the customer benefitted by avoiding unnecessary energy costs.

**Surcharges:** The GEM System allowed the customer to avoid surcharges by reducing TSS, FOG and COD/BOD to values within discharge limits.

**Downstream waste treatment:** Due to the increased removal of solids and organic loads and the amount of oxygen left on the stream by the GEM System, any further biological treatment needed will be at a fraction of the normal cost.

**Sustainability:** The GEM System allows the customer to grow and be able to double its wastewater effluent without changing the footprint even if the contaminant loading increases. The patented system will use less chemicals and produce drier sludge requiring less storage space and transportation costs.

### EXPERIENCE

CWT's successful implementation of the wastewater treatment solution for this customer resulted from the innovative design of the GEM System coupled with CWT's experienced engineers. CWT has over 170 successful installations in food and beverage, canneries, rendering, laundries, cosmetics and more and operates out of offices in the USA, Mexico, Colombia, Peru, Dubai and China. References for your specific application are available upon request.

