

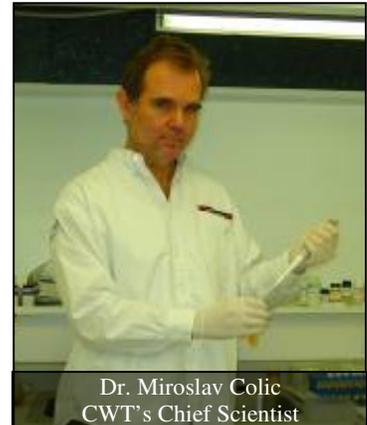


### INTRODUCTION

A premier dairy processor of milk, chocolate milk, ice cream, sour cream, cottage cheese and yogurt was in need of an on-site pretreatment technology that would remove high levels of TSS, FOG and COD/BOD. They were limited by space and hindered by surcharges.

During their search, the Client came across Clean Water Technology (CWT) and was impressed by the small footprint of CWT's Gas Energy Mixing (GEM) System supported by CWT's unique, proactive approach to solid/liquid separation. Client sent samples of wastewater at different stages of production to CWT's in-house laboratory for a complete treatability analysis. It was determined that with minimal chemistry, the GEM System would easily achieve the removal rates dictated by the regulatory agency.

Prior to purchasing the System, the Dairy requested a one week on-site demonstration using a pilot version of CWT's GEM System.



Dr. Miroslav Colic  
CWT's Chief Scientist

### CHALLENGES

During the demonstration, a large volume of coarse solids was present on a regular basis. Also, radical swings in both pH and contaminant loading were observed. The pH ranged from 2 to 12. The contaminant loading changed throughout the day from 50 to 1,500 ppm TSS, 335 to 2,600 NTU Turbidity and 750 to 18,500 ppm COD.

It was determined that the best removal rates were achieved when the pH was maintained between 7.5 and 8.0 and that the Client would definitely benefit from an equalization (EQ) tank to maintain pH and continually homogenize the waste stream. The coarse solids could easily be removed using a sidehill or rotary drum screen (RDS). Client chose the latter due to the self-cleaning benefit of the RDS.

Benefits of adding these components included less operator interaction, minimal chemistry usage, less and drier sludge, and higher contaminant removal.

### SOLUTION

In front of the GEM System 75/150, the Client installed a 20 mesh RDS to sit atop a 40,000 gallon EQ Tank outfitted with a D-Loop that adjusted pH and a mixer to homogenize the wastestream. By adding these components, the following benefits were achieved:

- RDS: Large solids were removed so chemistry was only used on the smaller solids (**Savings**)
- EQ Tank: Variations in contaminant loadings throughout the day were minimized and the stream was homogenized allowing for consistent treatment throughout the day (**Savings**)
- pH would be balanced to ensure that only minimal adjustments to mixing energy and chemistry would be needed, if any (**Savings**)
- GEM System 75/150: To provide reductions on average of 99% TSS, 70% COD/BOD and 99% Turbidity. (**Compliance/Savings**)

## DEMONSTRATION RESULTS

**TABLE 1: Influent @ 7 AM Day 1 – Treatment at pH 5.8 using 300 ppm coag, 30 ppm cationic and 10 ppm anionic**

PARAMETER	INFLUENT	EFFLUENT	PERCENT REDUCTION
TSS / ppm	6,100	25	99%
COD / ppm	32,000	8,000	75%
Turbidity/NTU	>1,000	13	99%

**TABLE 2: Influent @ 7 AM Day 2 – Treatment at pH 6.5 using 200 ppm coag, 20 ppm cationic and 10 ppm anionic**

PARAMETER	INFLUENT	EFFLUENT	PERCENT REDUCTION
TSS / ppm	2,700	25	99%
COD / ppm	12,000	5,000	58%
Turbidity/NTU	>1,000	11	99%

**TABLE 1: Influent @ 7 AM Day 3 – Treatment at pH 6.8 using 100 ppm coag, 20 ppm cationic and 10 ppm anionic**

PARAMETER	INFLUENT	EFFLUENT	PERCENT REDUCTION
TSS / ppm	1,100	28	99%
COD / ppm	5,000	1,500	70%
Turbidity/NTU	>1,000	12	99%

### Chemical Dosing

#### High:

Coag = 300 ppm  
Cat = 30 ppm  
Ani = 10 ppm

#### Average:

Coag = 200 ppm  
Cat = 20 ppm  
Ani = 10 ppm

#### Low:

Coag = 100 ppm  
Cat = 20 ppm  
Ani = 10 ppm

## OVERALL POST-INSTALLATION RESULTS

The GEM System prevailed over the many challenges presented where other technologies would have struggled. By installing the GEM System, the Client realized the following benefits:

- Lower Surcharges
- Elimination of Fines
- Adaptability to Changing Stream Conditions
- Easy Operation
- Small Footprint
- Improved Site Logistics
- Reduced Sludge-Related Costs
- Higher Chemical Efficiency
- Better Relationship with Regulatory Agency and Community as a Whole

Installation of the GEM System allowed for a smaller, more efficient biological treatment system to be installed at a later date – also saving footprint, real estate and treatment costs.

