

# FARLEY'S AND SATHERS CANDY COMPANY, INC.

**ETHAN GUIO**  
CHEMICAL ENGINEERING, UNIVERSITY OF IOWA



## COMPANY BACKGROUND



CRESTON

Farley's and Sathers Candy Company, Inc. is headquartered in Round Lake, Minnesota. The company produces a variety of non-chocolate candies and distributes its products throughout North America. The Creston, Iowa facility's main products are Trolli® brand Gummi Candies and other gelatin- and starch-based confections, such as the Jujufruit. The facility runs continuously five or six days a week and has a target production of 100 million pounds this year.

## PROJECT BACKGROUND

Continued growth in production over recent years has increased pressure on the company's on-site wastewater treatment plant. The resulting increases in water usage and carbon loading could potentially cause the effluent to exceed the concentration limits imposed by the municipal wastewater treatment plant, which could lead to surcharges. This project sought to proactively decrease production water usage and loading to improve on-site wastewater treatment plant operations and reduce costs.

## INCENTIVES TO CHANGE

Due to the rising costs of water and wastewater treatment, Farley's is committed to identifying opportunities for decreasing water usage and improving wastewater treatment plant operations. Excess loading received at the on-site wastewater treatment plant from the production facility could potentially cause Farley's to pay for tanker trucks to transport loads of wastewater to a third party for treatment at a cost of \$1,600/day.

## RESULTS

**Tanker Avoidance:** Changes in cleaning procedures have reduced both the amount of sugar and starch going down the drain and overall water use. Procedural changes were also intended to increase the percentage of waste that is swept into totes for use as animal feed, rather than being washed down the drain. Temperature probes have been inserted in several drains to enable the company to gauge water use at different times. High temperature readings show extended use of hot water hoses. Samples have



been drawn from drains throughout the plant to determine which production areas pose the largest problems in terms of loading. Additional monitoring is planned after the completion of this project. The changes have limited loading leaving the plant, eliminating the need for external water treatment and an estimated \$490,000 in related costs.

**Water Reduction:** The plant has already seen an 8 percent reduction in water use due to the changes in cleaning procedure and monitoring throughout the facility. This reduction has been realized despite an extra four production days in the month. Metering the water lines flowing to each process unit will show which work areas are using the most water and will help to minimize water use.

**Caustic Reduction:** The plant has seen a loading reduction similar to its water reduction. The reduction in loading

directly contributes to a reduction in the use of caustic soda, used at the plant's wastewater treatment facility to control pH. Caustic soda is a large expenditure for the company and a very corrosive chemical. Reducing its use cuts costs and reduces overall chemical use.

**Natural Gas Reduction:** Natural gas consumption in the plant is down 4 percent. This change can be attributed to a reduction in hot water demand due to changes in clean up procedures.

**Biogas Use:** The on-site wastewater treatment plant uses anaerobic digestion to treat the waste stream from the confection manufacturing facility. This process produces a biogas byproduct that is primarily methane. This gas is currently being flared off as a waste stream, although it could be used for practical applications. At one time, the gas was burned in one of the on-site boilers, but because of changes in gas production that process was halted. An outside contractor assessed the feasibility of using a set of 65 kW microturbines to consume the biogas and determined the capital cost would be prohibitive. Alternatives to the existing biogas control train are now being investigated to once again generate process steam for the manufacturing facility.



## CONVENTIONAL AIR POLLUTANTS AND GREEN HOUSE GASES DIVERTED IN STANDARD TONS

Total for all sectors					
CO <sub>2</sub>	SO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CFC	PM-10
875.97	1.00	1,555.90	746.45	5.95	0.17

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
TANKER AVOIDANCE	\$492,000		IN PROGRESS
WATER REDUCTION	\$26,000	3.9 MILLION GALLONS	IN PROGRESS
CAUSTIC REDUCTION	\$27,000	160 TONS	IN PROGRESS
NATURAL GAS REDUCTION	\$48,000*	105,960 THERMS	IN PROGRESS
BIOGAS USE	\$40,430	89,250 THERMS	INVESTIGATING ALTERNATIVES

\*Does not include savings in transport charges and other associated fees.