



BRETT FRITZE
CHEMICAL ENGINEERING, IOWA STATE UNIVERSITY



COMPANY BACKGROUND



MARSHALLTOWN

In 2007 JBS S.A. bought Swift Co. and is now the world's largest beef processing company and third largest pork processor in the United States. JBS is headquartered in San Paulo, Brazil and employs more than 54,000 people, 2,400 of which are located in its Marshalltown, Iowa facility. JBS in Marshalltown is one of three JBS pork facilities in the United States; the others are located in Worthington, Minnesota and Louisville, Kentucky. The Marshalltown facility processes hogs for a variety of products sold around the world.

PROJECT BACKGROUND

This internship focused on improving water usage and wastewater at the Marshalltown plant. The goal was to find economically friendly solutions that will conserve water and lower pollutants in waste streams, in keeping with the direction JBS has taken to become a role model in environmental responsibility.

INCENTIVES TO CHANGE

Environmental accountability was the main incentive for this internship. JBS performs daily testing of its wastewater to gauge its status in order to make changes or improvements. After on-site treatment, the wastewater is sent to the city for further water treatment. JBS's efforts will help the company maintain a strong relationship with the city and will be an opportunity for them to work together for environmental sustainability.

RESULTS

Dry Pickup: Using dry pickup for cleaning is an important procedural change that could provide considerable environmental and cost savings. The intern recommended that cleaning crews remove solid waste before hosing off equipment. This would reduce the total amount of solids washed down floor drains, which would also reduce loading and save more than 37 million gallons of water annually.

Reduce Scrubber Water: Three scrubbers were analyzed, in order to quantify their makeup water usage. After taking flow rates and checking with manufacturer specifications, the makeup water was reduced by 48 GPM. These scrubbers run 24 hours a day, six days a week, so more than 30 million gallons of water will be saved annually. Since this project has no overhead costs, savings were seen immediately.



Switch to New Polymer: This project studied switching to a new polymer used for on-site wastewater treatment. By switching to the new polymer, JBS would require two-thirds less polymer by weight, which would reduce annual use by 268 tons and save \$400,000 each year. This project is still under consideration because of the current improvements JBS has made in its wastewater treatment.

Nitrogen Removal: The intern analyzed the feasibility of installing a different system for nitrogen removal. The system is rated at 90 percent reduction in total nitrogen from waste streams. Although the system showed promise, it was not economically practical because of large investment costs and space requirements. However, as part of this analysis,

lab testing was done to determine loading concentrations on six waste streams in the facility. Based on these results, waste streams were quantified, which set the groundwork for pinpointing future source reduction opportunities.

CONVENTIONAL AIR POLLUTANTS AND GREEN HOUSE GASES DIVERTED IN STANDARD TONS					
Total for all sectors					
CO ₂	SO ₂	CH ₄	N ₂ O	CFC	PM-10
729.25	1.59	975.62	588.79	24.10	0.24

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
DRY PICKUP	\$96,286	37,043,308 GALLONS	RECOMMENDED
REDUCE SCRUBBER WATER	\$75,465	33,804,000 GALLONS	IMPLEMENTED
SWITCH TO NEW POLYMER	\$407,264	268 TONS	RECOMMENDED
NITROGEN REMOVAL	\$155,105	417 TONS	FURTHER RESEARCH NEEDED

