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**TYSON FOODS, INC.
—HILLSHIRE BRANDS**

STORM LAKE



COMPANY PROFILE

Tyson Foods, Inc. (Tyson), founded in 1935, is a multi-national company, employing approximately 137,000 team members at 268 processing facilities, offices, hatcheries and distribution centers globally. Tyson is one of the world’s largest food companies and a recognized leader in protein that processes meat and produces prepared foods. Within the process foods division is Tyson’s Hillshire Brands Storm Lake, Iowa, facility that has a daily capacity to process 36,000 turkeys. Operating five days per week with two eight-hour production shifts and one sanitation shift, the facility produces bulk quantities of white and dark meat and creates sausage blends.

PROJECT BACKGROUND

Water is essential to poultry processing. At Tyson’s Storm Lake turkey facility, water is used for scalding, defeathering, evisceration, product movement, and sanitation. The project focused on identifying water reduction and reuse opportunities in the evisceration process, the stage where the greatest volume of water is used. The intern also assessed potential water conservation outcomes for implementing a water leak maintenance program and upgrading sanitation hoses.

INCENTIVES TO CHANGE

Tyson is constantly striving for excellence and evolving to better meet the increasing demand for protein in responsible and sustainable ways. The company has a strategy at the corporate level to “Sustainably feed the world with the fastest growing protein brands for future generations.” The Hillshire Brands facility also follows Tyson’s best practices to work “to build a more sustainable food system,” with efforts to meet yearly facility water usage reduction goals.

RESULTS

Evisceration Wash Cabinet Reuse: In the evisceration process, multiple wash cabinets use potable water to rinse turkeys. The intern determined that water consumption could be reduced by using reuse water in the first two wash cabinets. After investigating multiple water reuse systems, the intern recommended directing water from the largest wash cabinet near the end of the line into a separate vessel. This separated by-product water could replace potable water in two upstream processes or be routed back to the same wash cabinet. Implementation of the recommended water reuse system is projected to result in a measurable reduction in water and natural gas usage, as detailed in the table below. The economic feasibility of an installation was ascertained by requesting vendor proposals.

Evisceration Nozzle Modification: In an effort to identify water reduction opportunities, the intern investigated alternative spray nozzles in two evisceration wash processes. Water flow rates of pressurized nozzles on select pieces of equipment were quantified, using a bucket, a stopwatch, and an ultrasonic transit time flow meter. The intern identified two locations where new nozzles could reduce hot water consumption by approximately 1.5 million gallons and lower natural gas usage by approximately 3,000 therms, annually. The nozzles were installed and the intern initiated testing with the Food Safety and Quality Assurance (FSQA) and evisceration departments to evaluate efficiency. Additional testing is needed to determine optimum alternative nozzle orientation and nozzle combinations.

Once the new nozzle combinations and orientation have been fine-tuned, this recommendation could be replicated throughout the evisceration process. Two additional locations have been evaluated for the new nozzles, thus far. Approximately 5 million gallons of water and 4,000 therms of natural gas could be reduced with this replication. Testing is also needed to determine optimum alternative nozzle orientation and combinations for these additional areas.

Evisceration Procedure Modification: During normal operating hours, team members have two breaks. Water is to be turned off as team members go to break and turned on when they return. The intern observed that water was inconsistently shut off during these times. To help ensure water would be shut off, designated team members were identified and engraved stainless steel tags were purchased to help designated team members identify which valves to turn off before breaks. According to an evisceration supervisor, this procedure for turning off and on water in evisceration is working well.

Evisceration Automation: Future facility plans to automate the evisceration process with more accurate and efficient technologies have the potential to reduce hot and cold water usage and reuse water throughout the process. This project requires replacing most of the equipment in the evisceration process and testing and approval of the FSQA department. Automated evisceration could be implemented at the Storm Lake facility by late 2023 or mid-2024.

Leak Maintenance: Throughout the facility, the intern observed various water leaks, most coming from water hoses. In discussing repair procedures with a maintenance supervisor, it was found that all maintenance-related repairs are reported word of mouth via radio or through reporting software. Unless the repair is a critical safety issue or emergency, repairs should be reported using the software which creates a work order that is prioritized, tracked and will ensure the work is completed. The intern emphasized that communication is critical for repairs to be completed in a timely manner that in turn, limits water waste.

Sanitation Spray Guns: Sanitation is crucial to any poultry processing facility. A portion of the hoses used to sanitize equipment at the Storm Lake facility are equipped with



spray guns and nozzles while others are simply open-orifice hoses. For consistent application and ease of use, new spray guns were purchased for the open-orifice hoses. The additional spray guns also eliminate excess water waste and increase efficiency.

It should be noted that the facility has elevated several of these projects, making it a discussion point in their continuous improvement meetings.

PROJECT	ANNUAL COST SAVINGS	ANNUAL PROJECTED REDUCTIONS	STATUS
EVISCKERATION WASH CABINET REUSE	\$221,942	21,120,000 gallons 44,035 therms	RECOMMENDED
EVISCKERATION NOZZLE MODIFICATION	\$16,352	1,556,303 gallons 3,241 therms	IN PROGRESS
EVISCKERATION PROCEDURE MODIFICATION	\$81,028	8,104,797 gallons 10,894 therms	IN PROGRESS
EVISCKERATION AUTOMATION	\$124,404	12,393,600 gallons 171,348 kWh	IN PROGRESS
LEAK MAINTENANCE	\$1,669	184,047 gallons	IN PROGRESS
SANITATION SPRAY GUNS	\$28,726	3,167,000 gallons	IN PROGRESS