



CONNOR LIVENGOOD

SCHOOL: Iowa State University

MAJOR: Chemical Engineering

BURKE MARKETING CORPORATION - HORMEL FOODS



NEVADA

COMPANY PROFILE:

Burke Marketing Corporation, a subsidiary of Hormel Foods, is located in Nevada, Iowa. The facility produces fully cooked meat products for a variety of customers. More than 1,300 different recipes are used on a frequent basis to meet customer needs. Burke has been in the pizza industry for 50 years with 40 of those years in the topping industry. Burke employs approximately 500 members across two production shifts and a sanitation shift, running an average of five days a week.

PROJECT BACKGROUND

The intern analyzed both water consumption and wastewater leaving the facility. A baseline was created to gain an understanding of where water is being used throughout the plant. This baseline was used to establish points of interest for further investigation. This project focused on reducing water consumption while not hindering vital operations, like sanitation. A secondary objective was to assess the pretreatment facility and explore methods to improve the quality of the effluent being sent to the City of Nevada wastewater treatment plant.

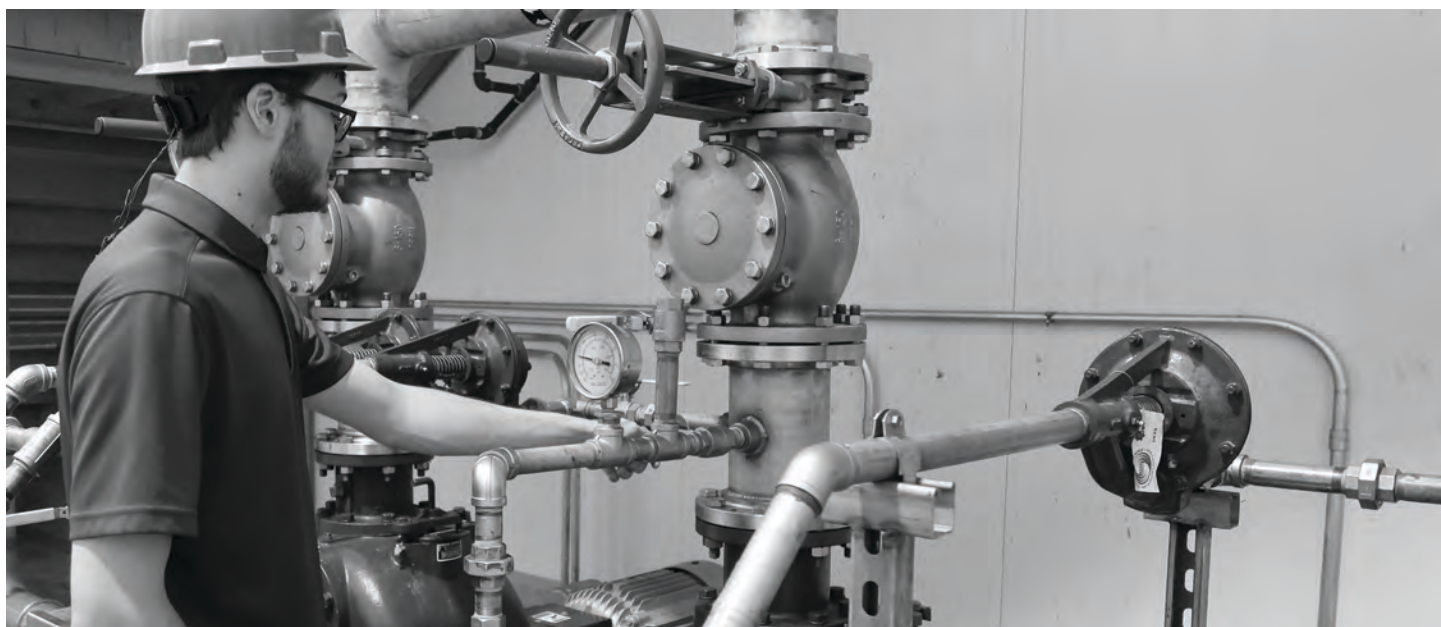
INCENTIVES TO CHANGE

Hormel is committed to continuous improvement and is working toward achieving 20 environmental and sustainability goals by 2030, called the 20 by 30 challenge. Goals are pursued and monitored through a company-wide Environmental Management System (EMS). In 2019, Burke greatly increased production by doubling its plant size. To offset environmental impacts from the expansion, Burke is aiming to annually

reduce the amount of water used in production and sanitation by two percent. As a second goal for the 20 by 30 challenge, Burke is targeting to reduce organic waste by 10 percent.

RESULTS

Piping Insulation: A heat exchanger uses steam to reheat a grease water solution to a desired temperature, keeping the grease from solidifying before it is separated from the water and made into a by-product. A long pipe run transports the grease water from the cooking process to the heat exchanger. The ambient air along the uninsulated pipe run causes the grease water to slowly lose temperature so that it requires reheating. Adding insulation to the pipe would help maintain the temperature of the grease water and increase flow efficiency through the pipe. A one-inch insulation thickness was recommended by the vendor based on insulation efficiency ratings and the cost of diminishing returns. This recommendation is also based on the building management system and data from temperature readings on the production floor. By insulating the pipe run, less steam





would need to be produced by the boilers feeding the heat exchanger, reducing both water and natural gas usage. The insulation could be installed with no effect to the production schedule. Once approved for funding, the company could begin installing the piping insulation.

Water Audit: During a plant shut-down, the intern conducted a water audit and measured any identified leaks. Both the nozzles and valves on the hose stations were found

to have slow leaks. The nozzles are regulated with a ball valve that may lead to the nozzles not fully shutting off. A spray gun nozzle system is recommended to reduce the risk of water loss and is currently being tested for its viability as a replacement. The valves found leaking were equipped with a backflow preventer that had started to corrode over time. Burke has started using a different valve type in other parts of the plant that is working well and does not leak. The intern recommends that the site change the leaking valves to the new type of valve. Installations of both nozzles and valves could take place when production is shut down. A preventative maintenance plan for the nozzles and valves would help reduce the chances of future leaks and address any identified leaks in a timely fashion in accordance with the site’s environmental management system.

To help identify leaks in the future, it is recommended that the company add a preventative water audit with the currently established compressed air audit. This would aid in keeping the system operating efficiently and reduce water loss. The intern observed that some equipment was left running during nonproduction days. A quick walk through, by either the

sanitation or maintenance crew, to turn off any equipment left running at the end of each production shift is recommended. This would result in a no cost remedy and reduce water usage. Both of these minor changes work toward a common goal of eliminating non-essential water consumption.

CBOD/TKN Cleaner: Soluble carbonaceous biochemical oxygen demand (CBOD) and total Kjeldahl nitrogen (TKN) are significant contributors to the plant’s wastewater contaminant load. The contaminants originate from the raw material handling and cooking processes. Under current operations, neither can be fully eliminated at the source or treated within the plant’s pretreatment system. A process has been identified that uses mechanical and biological systems to treat these two compounds and reduce overall treatment costs. It is recommended to pilot this process to confirm the viability and specifications of the system. The system is self-maintained and would have very little impact on the standard operating procedures for the wastewater operators at the plant.



ENVIRONMENTAL AND ECONOMIC SAVINGS TABLE

PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
PIPING INSULATION	\$40,560	1,019,128 gallons 24,965 therms	RECOMMENDED
WATER AUDIT	\$17,344	777,380 gallons 5,182 therms	IN PROGRESS
CBOD/TKN CLEANER	\$153,568	224.14 tons of CBOD 18.84 tons of TKN	RECOMMENDED