HORMEL FOODS CORPORATION

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COMPANY PROFILE
Hormel Foods Corporation is an American company based in Austin, Minnesota, and was founded in 1891. They produce many popular name brand food items as well as items under their own name. The company had more than $9 billion in net sales in 2015. Their Knoxville, Iowa, plant produces dry sausage products including pepperoni and salami. The Knoxville plant employs 159 employees and produces 137,035 pounds of product daily.

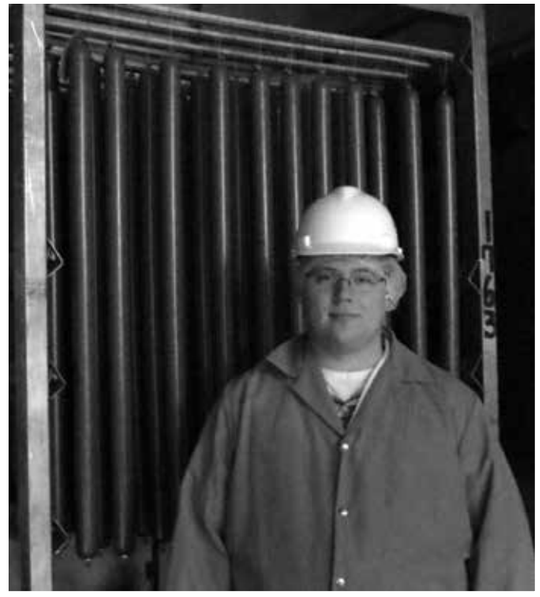
PROJECT BACKGROUND
The smokehouses at the Knoxville Hormel plant use a significant amount of water to rinse and cool product and are a major consumer of water in the plant. The water is used in a single pass process where it is disposed of after use. An optimized smokehouse shower system could allow the Knoxville Hormel plant to significantly reduce their water usage.

INCENTIVES TO CHANGE
Hormel Foods has put in place a set of environmental goals for 2020. One of these goals is to reduce the company's water usage by 10 percent. The Knoxville plant has taken aggressive steps to reduce water usage and is 83 percent of the way to their goal. The showering process used to cool product in the smokehouses is the source of a large portion of the plant's current water usage. A reduction in water use in the smokehouses would advance the company toward their water reduction goal and reduce operating costs.

RESULTS
The intern first compiled a water profile for the company, compiling a total water usage and cost for each production area. Costing information took into account all costs including water purchase, internal treatment and wastewater costs. After completing the water profile it was determined that nearly 75 percent of the plant's water usage is used by the smokehouse, representing a similar percentage of the plant's overall water costs. After completing the water profile, the intern focused on identifying opportunities within the smokehouse process that could reduce its water demand.

Circular Spray Nozzles: Products go through a cooling shower process after being cooked in the smokehouse. This cooling shower is performed by nozzles that spray a full cone with a square impact area onto the product. These square spray nozzles have a higher flow and could be switched to a circular spray option with a lower capacity that will still cover the product and use less water. Implementation of circular spray nozzles could move the Knoxville plant significantly closer to meeting their water reduction goals. A pilot is currently underway in one of the smokehouses to evaluate the new nozzles and to confirm the calculated results. Once confirmed and deemed efficient, this project will be replicated in all smokehouses at the Knoxville location.

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
CIRCULAR SPRAY NOZZLES	$106,976	11,206,171 gallons	IN PROGRESS
MISTING NOZZLES	$46,504	4,871,481 gallons	RECOMMENDED
ONE MINUTE REMOVAL	$6,331	663,225 gallons	RECOMMENDED



If circular spray nozzles are implemented as described in the previous recommendation, misting nozzles could then be added to facilitate evaporation while still using full cone spray in the rinse system. This hybrid system would combine the benefits of full cone spray with the benefits of evaporative cooling and could save 4.8 million gallons of water annually.

One Minute Removal: Internal product temperatures are recorded throughout the smokehouse cook process and associated cooling showers. Cooling shower lengths can vary, depending on the product being run. However, regardless of product, internal temperature data showed that only a very small temperature drop takes place in the final minute of each cooling shower. This marginal drop is unnecessary to the overall effectiveness of the cooling process. Assuming circular spray nozzles are implemented, replacing this final showering minute with a venting step could increase the efficiency of the cooling step in the smokehouse process and further reduce overall water usage at the Hormel Foods Corporation Knoxville plant.

Misting Nozzles: As part of the cooling process the plant also uses a deluge system where water is flooded over the product. An evaporative cooling system would provide more effective cooling potential and lower the amount of water being used.