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## Company Background

Lloyd's Barbeque Company was founded in 1978. In its beginning stages, the company produced strictly pre-cooked barbequed ribs. With increasing popularity, the slowly cooked, vacuum packed product made it to grocery stores around the country. The company broadened its retail base in 1996 by introducing a line of fully cooked shredded pork, chicken, and beef in Lloyd's signature barbeque sauces packed in re-sealable buckets. Lloyds Barbeque Company was acquired by Hormel Foods Corporation in 2005 and continues to make products that customers love.



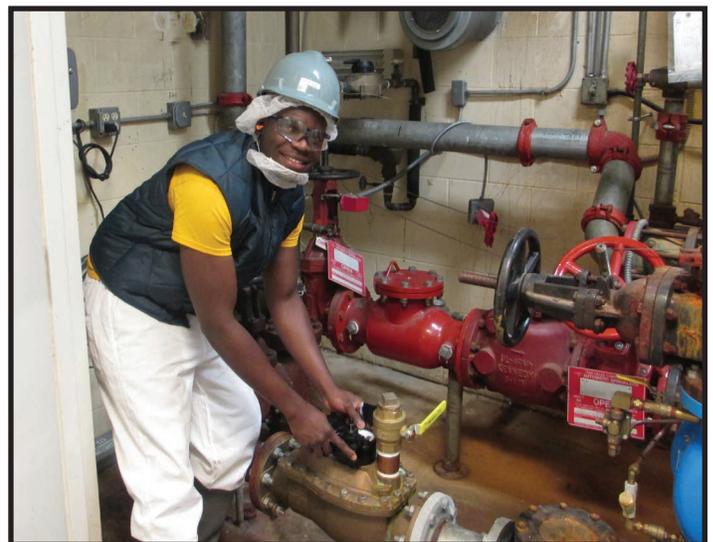
*"This internship gave me exposure to industrial equipment and environmental compliance as well as working within a team. It was eye-opening to learn that every recommendation made might not be economically feasible to implement and that information is not as organized as it is in college level classes." ~AO*

## Project Background

Lloyd's Barbeque Company processes both shredded meat and barbequed ribs. The process begins with the addition of brine, a flavored preservative and tenderizer, to the raw meat. Depending on the type of meat being processed, brine is either injected into the meat or added through a massager to aid in absorption. At this point, the meat is either hooked onto a rack or bagged and then placed on a rack. The racks are placed in a holding cooler before being cooked in the oven. Cook time, which is dependent on the type of meat, ranges anywhere from 4.5 hours to 18 hours. Once cooked, the product is cooled down in a blast cell to a temperature of 40 degrees Fahrenheit or less. It is then packaged in a film pouch or in a tub to be boxed, palletized, and shipped out to customers. Throughout the meat processing, water is utilized in various processes with the majority of the water consumed on the production floor (i.e. the industrial usage). Lloyd's industrial water usage is 60% of the overall water consumption at the plant and was the main focus of this project.

## Incentives To Change

As part of its corporate responsibility policy and goals, Hormel Foods has set targets to minimize its impacts on the world. Lloyd's Barbeque plays an important part in achieving these objectives. Hormel's 2020 goals include: reducing water use by 10%, non-renewable energy use by 10%, and solid waste sent to landfill by 10%. Lloyd's recognizes that by examining its processes, such as the wastewater pre-treatment, lawn irrigation, equipment sanitation, and investigating possible solutions, it can help Hormel Foods achieve its sustainability goals.





### Install Temperature Regulator on Wash Tank

Injecting direct steam in the tank is how wash water is currently heated, and with no insulation, energy loss is high. The current energy consumption of the wash tank is about 88,673 therms/year of natural gas. This energy is used in preheating and maintaining the water temperature at 210 degrees Fahrenheit. Based on the determination that the wash tank only needs to be at 140 degrees Fahrenheit, it is recommended that a temperature regulator be installed. This change has been implemented and will reduce energy consumption by 46,450 therms and result in annual savings of \$42,900.

### Optimize Hot Water Pump

The pump currently operates at 350 PSI and its total dynamic head is approximately 600 feet. At this setting, the flow rate of the pump is 125 gallons per minute (GPM) and the variable frequency drive operates at 25 horse power. Upon quantifying that turning down pressure to 250 PSI would reduce water and energy consumption to 102 GPM and 15 horse power respectively, it was recommended that this change be made. This change will result in approximately \$11,000 saved annually.

### Employee Training on Solid Waste

The plant recognizes it has an opportunity to reduce solid waste lost in production. As product lands on the floor; production yield is affected, water/energy consumption increases (to clean floor), chemical oxygen demand (COD) increases because of increased organic chemicals in the wastewater stream, and rendering charges increases. On the shredded product line in particular, there is an approximate loss of 726 pounds of meat per day. If just 4% of this loss can be prevented, there is a potential of making an additional \$20,000 yearly in income.

## Solutions

### Fix and Optimize Lawn Irrigation System

Through detailed investigation of the watering system, it was determined that the rain sensor was not working, the runtime for all the zones were set too high, the lawn was watered every day, and there were leaks in the system. Installation of a functioning rain sensor would reduce the water consumption as the sensor would stop a scheduled run if there had been rain early on in the day. Programming the zones to run for a shorter period and every other day would be beneficial, as well as hiring a contractor to fix leaks in the system. Installing a master valve would limit each run to a constant amount of water so this would limit water lost through leaks. Implementing these changes would reduce yearly consumption by 878,200 gallons, saving \$3,000 annually.

Recommendation	Annual Reduction	Annual Income/ Savings	Status
Optimize Lawn Irrigation	878,200 gallons	\$3,000	Implemented
Install Wash Tank Temperature Regulator	46,450 therms	\$42,900	Implemented
Optimize Hot Water Pump	3,930 therms 1,324,800 gallons 25,000 Kwh	\$11,000	Implemented
Employee Training on Solid Waste	6,000 lb	\$20,000	Recommended