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JBS USA, LLC

MARSHALLTOWN



COMPANY PROFILE

JBS USA is a subsidiary of Brazilian company JBS S.A., and is headquartered in Greeley, Colorado. JBS USA is a leading producer of beef, pork, and poultry, producing more than 280 million servings of protein daily around the world. The company employs more than 66,000 team members. The pork facility in Marshalltown, Iowa, processes about 21,000 head per day and employs close to 2,500 people.

PROJECT BACKGROUND

This year's intern project at JBS Marshalltown focused on water conservation, with an emphasis on water reuse and reduction. The intern was tasked with identifying water savings opportunities and recommending equipment modifications to achieve environmental and economic savings. Assessments were conducted throughout different areas of production, with increased attention to the largest water using systems. Repurposing cooling water streams and reducing process water consumption were revealed as key areas of interest. Recommendations were offered after considering complexity of implementation and cost savings opportunities.



INCENTIVES TO CHANGE

In 2021, JBS committed to a net zero emissions goal by 2040, becoming the first global meat and poultry company to make such a pledge. Water conservation measures have the potential to propel JBS forward in achieving this ambitious goal. Emissions can be avoided by decreasing water usage, which in turn decreases energy needed for moving, chilling and heating water. Water conservation has both environmental benefits and economic savings. JBS, driven by its commitment to continuous environmental improvement, aims to reduce water usage by 15 percent in its Marshalltown plant by 2030.

RESULTS

Bone Crusher Cooling Water Efficiency: The ham boning section of the facility features a bone crusher area where meat from the ham line is harvested off bones. Crushing equipment utilizes a hydraulic system with presses, each requiring a cooling water stream for their oil reservoirs. After measuring the flow rates of this cooling water, each stream was found to be exceeding equipment flow rate specifications – providing more cooling water than needed. Reducing the flow rates to be more in line with specifications could save overall water usage. Additionally, a shutoff program could be established so the cooling water is not flowing overnight and on weekends when the equipment is not in use. This can be done without significant investment by changing the shutdown and startup operating procedures and installing various flow controls.

Substitute Carcass Wash Water with Singer Rail Water:

A rail system is used to transport hogs through the various stages of production. In the dehair section of the plant, singers use natural gas to singe the remaining hair from the hogs before they continue for further processing.

The north singer has a cooling water stream running along the rail section to prevent warping due to the heat from the singer. This water goes directly to the drain without secondary use.

This water could be rerouted and used in the nearby carcass wash since the flow rates and pressures needed are the same. Implementation would require installing new piping to reroute the water stream.

Flow Control on Dehair Machines: There are four machines in the dehair section of the plant that use recirculation pumps to recycle water continuously through the top of the machines. The dehair machines require a high volume of makeup water, causing these machines to be one of the largest areas of water usage in the plant. The amount of makeup water is regulated by actuating a ball valve until there is a specified amount of overflow. Commissioning valves could provide better accuracy in controlling the makeup water and minimizing overflow. After updates are completed to the dehair units, commissioning valves could be installed by maintenance staff.

Weekend Water Shut-off: While most of the facility shuts down on weekends, there is still significant unidentified water usage. Over the course of several weekends, sources of unnecessary water use were identified, measured and documented. It is recommended that a weekend water team is created with designated employees to perform quick walk-throughs and turning off water at the beginning of each weekend. Implementation will require identifying and training selected employees to fulfill this team role.

New Fitting on Casings Sink: A sink in the casings building was losing a significant amount of water due to a broken fitting. The broken fitting was causing the tube to dislodge due to backpressure when the sink was off. The issue was reported and maintenance staff promptly addressed the issue and repaired the leak.



Steam Leak Repair: A significant steam leak was observed on the roof above the rendering area where meat material from the ham line and loin boning areas are pumped to the Rendering Department. Steam currently runs through a tracer line that keeps the pipes warm so that they don't get clogged in the winter months, but this steam is not needed in the summer months. Repairing the steam leak would prevent the loss of water and energy when steam is needed in the colder months. Turning this steam flow off during warmer months could generate additional water and energy savings. Implementation would require modifying the pipe on the tracer line.

PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
BONE CRUSHER COOLING WATER EFFICIENCY	\$29,440	4,463,344 gallons	RECOMMENDED
SUBSTITUTE CARCASS WASH WATER WITH SINGER RAIL WATER	\$87,197	13,219,800 gallons	RECOMMENDED
FLOW CONTROL ON DEHAIR MACHINES	\$303,379	56,108,160 gallons	RECOMMENDED
WEEKEND WATER SHUT-OFF	\$47,333	8,289,590 gallons	RECOMMENDED
NEW FITTING ON CASINGS SINK	\$12,134	1,839,600 gallons	IMPLEMENTED
STEAM LEAK REPAIR	\$1,727	3,948 therms 5,304 gallons	RECOMMENDED