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# JBS SWIFT PORK

## COMPANY PROFILE

JBS USA is a leading global food company, headquartered in Greeley, Colorado. JBS USA, the nation's second-largest producer of fresh pork, delivers high-quality food products to customers in 26 countries on five continents. The company operates five pork production facilities, including JBS Swift Pork in Ottumwa, Iowa. The Ottumwa plant employs more than 2,200 team members and is a major contributor to the international pork market with production numbers averaging 20,000 hogs per day.

## PROJECT BACKGROUND

JBS Swift Pork utilizes water for a number of different cooling applications and systems throughout their production processes. The aim of this project was to conduct a full water usage analysis for plant cooling systems, identify water savings and reuse opportunities and to recommend feasible solutions. A goal of reducing water consumption by 11 gallons per unit harvested was established. Seven projects, with varying capital input and water savings, were recommended.

## INCENTIVES TO CHANGE

Since 2015, JBS has reduced its water usage by more than 25 gallons per unit. In 2018 and again in 2020, JBS Swift Pork received the EPA Region 7 Pollution Prevention Award, in recognition of their efforts to reduce, eliminate, and prevent pollution at the source. By continuing to implement water-saving solutions, it is expected that JBS will not only reduce their operating costs but continue to lead the food processing industry with environmental excellence.



## RESULTS

### Reuse Spray Chiller Water:

Chilled water is sprayed onto the hogs within the carcass bays to preserve product quality. The drained chilled water has the potential to be used as second-pass water within the plant's hot vapor air scrubbers. Elevated temperatures within scrubber

systems can pose significant scaling risk and reduced system efficiency. Filtration and reuse of the chilled water within the rendering air scrubbers will help maintain lower internal temperatures, improve odor control, and generate water savings. Quotes for implementation and filtration have been forwarded to management for final approval.



### Spray Chiller Nozzle

**Redesign:** The spray chiller within the carcass bays uses a series of nozzle rows to maximize chilled water coverage on the product. The current deflection nozzles lining the outer rows of the bays produce nearly twice the flow with half the spray angle required. Installing a more efficient

nozzle tip on the edge rows poses significant water savings. An associated energy savings may also be realized by decreasing the need to chill water, especially during warm months.

**Common Sump on North Condensing Towers:** JBS Ottumwa utilizes two evaporative condenser systems for the refrigeration and cooling systems within the plant. The western towers utilize a common sump that maintains the towers as a single system, whereas the northern towers operate on an individual basis. Due to condensers being controlled as individual units, the northern towers can be susceptible to water conductivity inconsistencies. The addition of a common sump system on the northern towers would allow the automated makeup system to regulate the towers as a singular system leading to increased cycles of concentration. A common sump tank will also be capable of holding the combined volume of the condensers during routine drainage, thus preventing excess water and treatment usage. Vendor quotes for implementing a common sump are being formed by the plant's utilities management team for review and approval.

**Lock Bypass Systems:** Two bypass valves are consistently left open over the intended automated systems in the live barns and dehair areas during regular operation. Bypassing these



systems creates a significant amount of water loss. Installing maintenance locks on these bypass valves would prevent associated water loss and create a simple accountability system.

**Leak Repair within Carcass Bays:** A number of leaks were discovered within the carcass bay spray chiller system, causing chilled water loss. The leaks are caused by a rotating coupler as the automated valves continually open and close. Repairing the leaks and purchasing an overstock of replacement parts will allow utilities staff to facilitate future repairs in a timely manner.

**Reuse Treated Water:** JBS has a long-term vision to reuse treated production water in their facilities. A full water quality analysis was performed in order to identify reuse opportunities and filtration needs to allow application within the plant's live barn misters and evaporative condensers. Installing an industrial sand filter as well as a reverse osmosis system could

yield heavily-purified, non-potable water capable of exceeding treatment standards in the recommended systems. Future non-potable reuse opportunities will continue to be identified within the plant by JBS management. Once final flow rates and water quality requirements are established, equipment and filtration specifications can be further reviewed and finalized.

**Overflow on Scald Zone 3:** The scald tubs use a mixture of 140°F water generated by the plant, fresh city water, and steam to maintain a consistent water temperature. Water inlets are manually utilized throughout operation when scald water levels decrease or temperature adjustments need to be made. Within the scald tubs, Zone 3 is most susceptible to overflow during normal operations due to its operation at the highest water level. Installing an overflow on Zone 3 that flows directly to the dehair tanks will allow the overflowing scald water to be reused for multiple passes within the dehair recycle system while also preventing water loss.



PROJECT	ANNUAL COST SAVINGS	ANNUAL ENVIRONMENTAL RESULTS	STATUS
REUSE SPRAY CHILLER WATER	\$54,089	6,952,400 gallons	RECOMMENDED
SPRAY CHILLER NOZZLE REDESIGN	\$58,720	4,447,677 gallons 271,150 kWh	IN PROGRESS
COMMON SUMP ON NORTH CONDENSING TOWERS	\$63,805	7,781,617 gallons 1,167 lbs. treatment	RECOMMENDED
LOCK BYPASS SYSTEMS	\$118,070	42,471,383 gallons	IMPLEMENTED
LEAK REPAIR WITHIN CARCASS BAYS	\$3,592	272,143 gallons 16,591 kWh	IN PROGRESS
REUSE TREATED WATER	\$278,894	35,847,635 gallons	RECOMMENDED
OVERFLOW ON SCALD ZONE 3	\$2,910	373,629 gallons	RECOMMENDED

