

Northern Star Co.



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Company Background

Northern Star®, a leading producer of refrigerated potato products, was founded in 1951. Located in Chaska, the company specializes in a variety of refrigerated (but never frozen) potato products, such as the Simply Potatoes product line, for both the foodservice and consumer markets. The Chaska plant employs approximately 260 people. In 1987, Northern Star joined the Michael Foods family of businesses, which offers a full line of dairy case and refrigerated potato products and is the world's largest supplier of processed eggs.



“The internship gave me hands-on experience in an industry, allowed me to be in charge of a project, work with all levels of employees, and make a real difference in terms of water conservation and cost savings.”

Project Background

The goal of the project was to find economical solutions to conserve water, reduce wastewater, and save money. The focus was in three main areas of the facility: receiving, peelers/scrubbers, and the clean room.

Incentives to Change

Water is used in some amount, large or small, in just about every aspect of production. On a daily basis, the facility processes approximately 1,000,000 pounds of potato products. Well water is used to wash, prepare (peel, slice, dice, and mash), transfer, and cook the potatoes, as well as to clean and sanitize. Reducing water use or reusing water in certain process steps would improve plant efficiency and help avoid the cost of permitting and drilling an additional well. Water conservation also reduces expenses for water treatment, pumping, and sewerage. The availability of extra water would allow the company to expand their business and increase production.



Solutions

Lower Water Level in Potato Washer

Maintaining the appropriate water level in the potato washer is necessary to ensure capture of floating debris and continuous potato flow through the washer. At the onset of the internship, the water level was set at 27.5 feet and the vessel was constantly overflowing. After interviewing workers, I found out that the level is controlled from the operating room. I decided to experiment with the level by dropping it in half-inch increments and making sure the process was still effective. As a result of dropping the level two inches, the washer overflows less often.

Replace Float in Basket Washer

During the facility walk through, I noticed that the basket washer was overflowing significantly; a float that should control the water level was lying at the bottom of the tank. In addition to the missing float, I learned the operator has a large impact on the amount of water entering the machine. A flow meter was used to measure the flow to the basket washer at different valve settings. The valve allows the water to flow from 3 to 20 gallons per minute. The operator now adjusts the valve to the lowest setting, which reduces the amount of overflow significantly.



Reduce Peeler Exhaust Spray Time

The peeler exhaust spray is necessary to keep the exhaust tank cool and to knock down particulate. The machine was recommended to be run much lower than the 40-50 seconds it was set at upon my arrival. The time has now been lowered to around 30 seconds, which should save 93,000 gallons of water annually.

Replace Leaking Solenoid

Peeler #2 appeared to be regularly overflowing. Research into this situation led to the discovery that a solenoid, an electronic device that signals when to open and close a valve, was no longer working and needed to be replaced. This may be a harsh environment for the solenoid and it will need to be checked more frequently so that water is not being wasted.

Reuse RO Reject Water

The reverse osmosis (RO) system generates reject water, which is stored in a tank. The water can be used for certain steps in the process, such as potato washing and peeler exhaust spray. The tank can store up to 5,000 gallons. The potato washer was originally selected as the only machine to receive the reject water. Since the reject water storage tank was not running dry, we diverted the reject water into peeler #2 exhaust spray, which saves approximately 15,000 gallons of fresh water a day.

Reuse Scrubber Water

The biggest water users in the plant are the scrubbers. Not only do they run at over 30 gallons per minute, they also run almost constantly - close to 20 hours a day. The water they use becomes laden with potato waste and grime and is sent down the drain. Filtering this water and reusing it in the scrubber is an option to consider.

Install Auto Fill Valves on Pump Tanks

There are two pump tanks located on the peel floor. The tanks must have water in them or the pumps will become plugged. The valves filling the tank are manually operated and flow at around 50 gallons per minute. If the valves on the tanks are not monitored, they constantly overflow, resulting in a significant amount of wasted water. An auto fill valve could greatly reduce overflow.

Optimize Surge Bin Water Level

The surge bins store the potatoes before they are sent to the blancher or cutter. Once the potatoes are added, the surge bins need to be filled with water to prevent the potatoes from rotting. Currently, the operators fill the surge bins before the potatoes reach them, resulting in overflow once the potatoes are added. The water level should be regulated so that it is full enough for the potatoes, but not so full that it overflows.

Recommendation	Reduction	Annual Savings	Status
Lower water level in potato washer	2,800,000 gallons water	--	Implemented
Replace float in basket washer	6,700,000 gallons water	--	Implemented
Reduce peeler exhaust spray time	93,000 gallons water	--	Implemented
Replace leaking solenoid	1,400,000 gallons water	--	Implemented
Reuse RO reject water	5,250,000 gallons water	--	Implemented
Reuse scrubber water	8,250,000 gallons water/scrubber	--	Under review
Install auto fill valves on pump tanks	4,200,000 gallons water	--	Under review
Optimize surge bin water level	1,900,000 gallons water	--	Under review
Total		\$166,300	