Seneca Foods

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Company Background

Seneca Foods Corporation is a food processing and distributing company specializing in frozen and canned fruits and vegetables. Founded in 1949, the company has grown vastly from its beginnings as a frozen juice manufacturer in upstate New York to one of the most highly integrated fruit and vegetable processing companies in the US, operating plants in eight states and distributing its products worldwide. Seneca owns well-recognized national brands such as READ, Aunt Nellie's, and Libby's and exports US-grown food to over 95 countries. The company's facility in Glencoe, MN, is a seasonally-operated plant that produces primarily corn and peas in both frozen and canned varieties.

Farm Fresh Goodness Made Great

"Working with Seneca Foods was a wonderful experience and I learned a lot about what it takes to make a process more sustainable. This experience has furthered my skills as an engineering student and my ability to gather data to find creative solutions. I am grateful to MnTAP and Seneca for giving me the opportunity to do so. It was a lot of fun." ~ LL

Project Background

In 2018, Seneca Foods' plant in Glencoe sent approximately 1,330,000 gallons of wastewater per day of production to the site's stabilization ponds; this amounted to 210,000,000 gallons of wastewater annually. With the ponds nearing the maximum capacity of 290,000,000 gallons, Seneca's project goal was to reduce wastewater reaching their ponds as much as possible, while determining potential reasons for apparent losses in the water balance of the facility. The company also sought to further investigate and evaluate the potential for previously identified solutions towards water conservation.

Incentives To Change

As water usage guidelines set by Seneca and the MPCA have tightened and the amount of product being processed has grown, the priority of reducing wastewater reaching Seneca Foods' stabilization ponds has increased. The Glencoe facility is reaching the point where the ponds may start limiting their ability to produce product. Finding water savings opportunities would help alleviate this constraint and allow them to invest in other areas of the plant, rather than spending resources on treatment of wastewater in the pond system.

"Seneca Foods is always looking for ways to conserve water. When we had the opportunity to work with MnTAP and have an extra set of eyes look at our process, we were excited to see their recommendations."

~ Mike Stumm
Plant Superintendent
Seneca Foods Corporation

Solutions

Reduce Water Flow Rate for Pushing Product from 3rd to 2nd Floor

Water is used throughout the facility to push peas and corn via pipes and flumes during production. One such pipe running from the third to second floor of the facility is an opportunity for water reduction. It was suggested that the valve controlling the flow of water through this pipe be turned down rather than left fully open in order to take advantage of gravity to move product along. Decreasing the flow by 30% would save 1,350,000 gallons per year of water.

Optimize Frother Flow Control

Frothers are used to separate skins and split peas from the product stream by floating them out of a tank; the good product then sinks to the bottom and is pumped to the next processing step. While many of these frothers were working properly, some were operated with constant overflow which was not the original design and presented a significant opportunity for water savings. Conducting a thorough assessment of each of the twelve frothers in the pea dock provided individualized solutions to minimize overflow. These included adding or adjusting float valves to the tanks, fixing or replacing broken valves, adding signage, and increasing the height of splash guards. The cumulative water reduction in this area would be 28,000,000 gallons per year, with a cost savings of $5,400.

Replace Nozzles on Hoses

Hoses are used throughout the plant for general cleaning, foam knock down, and pushing fallen product to drains.

Replacing the nozzles on 40 hoses in the production building with more efficient nozzles that have equal maximum rated pressure but a lower flow rate could decrease total water usage by approximately 90%. This would save 8,000,000 gallons of water per year.

Fix Leaks Throughout the Plant

Several identified leaks from tanks and process piping were measured and quantified. Fixing these leaks would save up to 1,940,000 gallons per year.

Readjust Spray Nozzles Rinsing the Wash Reels

Several wash reels are used to mechanically separate and remove defects from the product stream. As they rotate, they are continuously rinsed by spray nozzles that hang above the equipment. These nozzles should be optimized to provide the minimum rate of spraying to clean the reel. A 20 minute test on one of the reels demonstrated that operating at 70% of the current flow during production would be feasible. If similar settings were to be implemented across all 24 spray nozzles rinsing the reels, the savings would be 275,000 gallons of water per year.

Use Brooms Instead of Hoses to Clean Floors

Regular reminders from supervisors to plant staff to use brooms to clean floors is encouraged to decrease overall water usage. While using hoses may be more convenient and at times necessary for adequate cleaning, switching to the use of brooms as the standard practice will lead to water savings. A modest reduction in hose usage for cleaning could save 500,000 gallons per year.

Recommendation	Annual Reduction	Annual Savings	Status
Reduce Flow of 1st Reclaim Water From 3rd to 2nd Floor	1,350,000 gallons	$300	Recommended
Optimize Frother Flow Control	28,000,000 gallons	$5,400	Recommended
Replace Nozzles on Hoses	8,000,000 gallons	$1,600	Recommended
Fix Leaks Throughout the Plant	1,940,000 gallons	$400	Recommended
Readjust Spray Nozzles at the 5th Reclaim	275,000 gallons	$50	Recommended
Use Brooms Instead of Hoses to Clean Floors	500,000 gallons	$100	Recommended

MnTAP Advisor: Daniel Chang, Associate Engineer