Great Lakes Coca-Cola

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Company Background

Great Lakes Coca-Cola Bottling (GLCC or GLCCB) is a bottler and distributor of various Coca-Cola products. The company operates 29 facilities throughout the region, including 9 bottling plants. The Eagan, MN facility manufactures and delivers Coca-Cola products to vendors in the surrounding area. The facility mixes ingredients sourced from Coca-Cola North America, with water extracted from onsite wells to produce syrup blends for a variety of products. With an area of 640,000 sq ft under the roof, the Eagan facility has a team of 600 employees.

"This internship with MnTAP has given me the opportunity to not only work in a huge industrial setting, but to lead my own project. I had a really fun time working with some great individuals and was happy to see that I was able to do my part and actually make an impact towards water conservation." ~ MFK

Project Background

One can of a regular soft drink is 90% water. One can of a diet soft drink is 99% water. Given these numbers and the production capability of one of the biggest multinational beverage corporations in the world, it is well known that GLCC facilities have a high water demand. The Eagan facility on its own extracts an estimated 140 million gallons of water per year using two onsite wells and purchases about 15 million gallons per year from the City of Eagan.

Incentives To Change

Last year, approximately 68% of the total water extracted and purchased by the site was used in manufacturing product, while the remaining 32% was discharged as wastewater from various processes. Over the past several years, the Eagan facility has reduced their percentage of total water discharged from above 50% more than a decade ago down to 32% last year. The company wants to continue to improve their overall sustainability score by further reducing this number. GLCC Eagan partnered with MnTAP on a 2021 intern project with the primary goals of reducing overall site water usage, optimizing facility processes, and reducing various utility costs.

SOLUTIONS

Bottle Rinser Flowrate Reduction

On the bottling lines at the Eagan facility, the bottles are blow molded into shape using In-Line Blow Molding (ILBM) technology. They are then rinsed with chlorinated water right before they enter the product filler. This bottle rinser is located on two bottling lines and has a flow rate of 2.35 gallons per minute. Due to the presence of ILBM onsite, other GLCC facilities have deemed the bottle rinser as being a redundant process. Current experimental results indicate that just by reducing the flowrate for each rinser to 1 gallon per minute, GLCC can save at least 450,000 gallons of water and $1,700 per year.

"Our MnTap Intern, Fawad Khan, was a pleasure to have as part of our team this summer. His eager attitude, coupled with the professionalism and integrity in the way he approached his work, virtually guaranteed the successful outcome that was realized. A very worthwhile experience!"

~ Mark Hammerbeck, QA Manager
Great Lakes Coca-Cola

Solutions

Bottle Rinser Shutoff and/or Removal

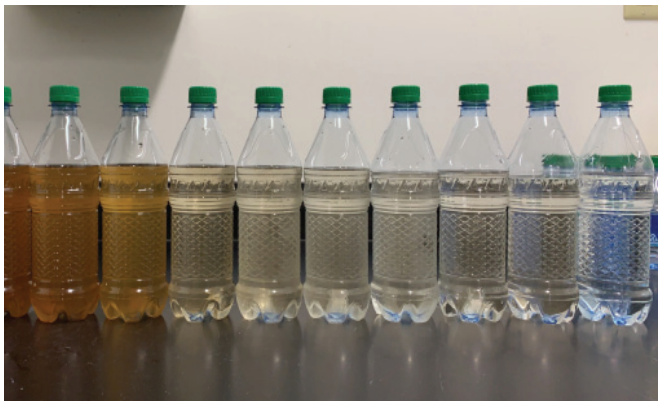
If results from further testing validate the absence of bottle rinsing, the water flow to the rinsers can be turned off completely, leading to a water savings of more than 800,000 gallons and $2,900 per year. The equipment can then be removed and replaced with a continuing length of a simple air conveyor. Equipment removal is a large capital cost, but doing so will eliminate the need for maintaining and cleaning the rinser. In addition to cleaning and maintenance savings, energy savings will be realized due to less equipment and shorter length the bottles have to travel to get to the product filler.

Backwash Time Reduction

Four onsite dual media filter tanks are responsible for removing iron and manganese from incoming well water. These tanks are backwashed twice a week to unclog the filters inside them. Thanks to sampling and lab testing completed during the project, it was found that the set backwash time could be reduced by at least 20% for each tank. This was one of the biggest water conservation opportunities found at the facility. By reducing the backwash time by just 5 minutes across all four tanks, a savings of more than 1,250,000 gallons of water and $4,600 per year can be achieved. This will also reduce the downtime of the dual media tanks and increase overall process efficiency.

Turbidity Sensor Installation

As a further improvement to the previous recommendation, turbidity sensors can be installed in the backwash effluent pipe of each of the dual media tanks, while also implementing process control. The sensors can continuously monitor the turbidity values of the water during the backwash cycle and the process control system automatically halts the cycle when the value reaches a certain set point. With this, the backwash cycle can rely on real-time turbidity readings rather than a preset time. This is the most optimal recommendation, because according to economic calculations, each minute reduced in backwashing amounts to over $900 in savings per year across all tanks. Implementing turbidity sensors would reduce backwash time by 28%–56% and reap annual savings of at least 2,560,000 gallons of water and $9,500.



Recommendation	Annual Reduction	Annual Savings	Status
Reduce bottle rinser flowrate to 1 gpm	450,000 gal water	$1,700	Recommended
Eliminate bottle rinsing stage	800,000 gal water	$2,900	Needs further analysis
Reduce backwash time on dual media tanks	1,250,000 water	$4,600	Implemented
Install turbidity sensors on dual media tanks	2,560,000 water	$9,500	Recommended

MnTAP Advisor: Matt Domski, Intern Program Manager