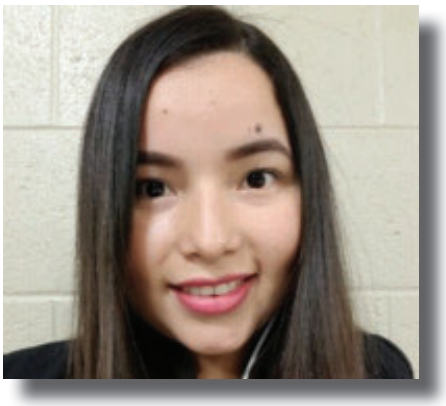
Abbott



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Company Background

Abbott is a multinational medical device and health care company with headquarters in Illinois, USA. Abbott has been helping people live their best lives for more than 130 years. The Woodridge site in Little Canada is part of the structural heart division in the medical devices area. The site is responsible for manufacturing mechanical heart valves, tissue heart valves, and stents. One of Abbott's most recent milestones is that their devices helped improve the lives of 2,000,000 patients in 2010.

"This internship has shaped me into a more environmentally responsible engineer by helping to conserve water and energy. It gave me the opportunity to use my in-class knowledge in a real work place." ~ NH

Project Background

Manufacturing medical devices involves process stages with relatively high water use demand. The Woodridge facility uses around 9.8 million gallons of water per year and has goals to minimize overall water consumption. From 2010 to 2019, Abbott has reduced its global water consumption by approximately 28%. The company continues to set goals in ordered to minimize water and energy consumption and waste generation. This project focused on identifying and minimizing areas of high water use and waste streams. This was achieved by analyzing and mapping process steps, identifying solutions for efficiency and creating action plans for the best solutions to minimize water & energy usage and waste.

Incentives to Change

Abbott maintains an on-going committment to protecting the environment and reducing the footprint of its business operations, including the protection of clean water resources around the world. Abbott has set a goal to reduce 30% of overall water consumption from 2010 to 2020. Through the work of a MnTAP intern, solutions identified at the Woodridge facility will contribute to achieving this ambitious and important goal.

SOLUTIONS

Reverse Osmosis (RO) System Optimization

Abbott uses a reverse osmosis (RO) system as a pretreatment step for the Deionization (DI) system. This reverse osmosis equipment can recover up to 75% of the water and a minimum of 96% Total Dissolved Solids (TDS) rejection. Although the system rejects 98.6% of impurities, it recovers 48% of the water, with the remaining 52% going straight to the sewer. There is an opportunity to increase the recovery percentage, which helps decrease energy and water consumption of the equipment.

"The MnTAP Intern Program provided the site with a focused effort to identify water reduction opportunities. Nahir's adaptability, enthusiasm and ability to gain support from staff was a great asset to the project. We appreciate all the work Nahir has provided and know that she will be successful in her future endeavors."

~ Mike Godfrey, EHS Manager

Solutions

Reusing RO Reject Water

Reusing the reverse osmosis reject water was found to be another opportunity to save water. Abbott can save from 25% to 40% of the water rejected from the reverse osmosis system if re-use is implemented. This reject water from the reverse osmosis system could be collected and sent to reclaim water tanks for use in the wet scrubbers.

Changing DI Water for Soft Water in the Fog Chamber

There are two horizontal wet scrubbers in the plant used to purify the exhaust from the reactors in order to release clean air. The particle growth system in one of the scrubbers uses DI water to help coalesce particles and obtain better filtration. The use of only DI water is not required for this process, because one of the scrubbers has operated for years using only softened water. Switching from DI water to soft water will conserve water and energy, since the DI water requires a 3-step purification process: softening, reverse osmosis, and finally, deionization.

Scrubber Filter Rinsing Time Optimization

In order to clean the air as much as possible, there are 4 filters in the scrubber with different mesh sizes, which the air passes through before it is released into the environment. The filters are rinsed on an interval of 15 minutes. Each nozzle runs for a specific fixed time even if no reactors are in use. There is a controller to manage how long they should run depending on the number of reactors running. Optimizing the rinsing times by using the controller was evaluated for its potential to minimize water usage. It was found that Abbott's Woodridge site was operating at set points below what the controller program recommended. Therefore, this change would not yield any water savings and was therefore not recommended.

Recommendation	Annual Reduction	Annual Savings	Status
RO system optimization	560,000 gallons 2,200 kWh	$4,400	Planning
Reusing RO wastewater	250,000 gallons	$1,850	Investigating
Changing DI water for soft water in fog chamber	575,000 gallons 26,400 kWh	$6,900	Under review
Rinse time optimization for scrubber filter	N/A	N/A	Not Recommended

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