



General Mills



Abby Reinert

Bioproducts & Biosystems Engineering
University of Minnesota Twin Cities

Company Background

General Mills, Inc. is a multinational manufacturer and marketer of branded consumer foods with headquarters in Golden Valley, Minnesota. The James Ford Bell Technical Center (JFB) is the global research and development facility for General Mills. All General Mills products are innovated at JFB, so there are several pilot plants for testing and scale up. Products from Nature Valley, Cheerios, Blue Buffalo, and many more brands are produced there. The facility hosts over 900 employees and is over 720,000 sq. ft.



"This internship has been an amazing opportunity for me. I have always loved the idea of working in the food industry, and it has been extremely rewarding to contribute to making food production more sustainable. This program allowed me to take control and lead my own project, as well as encouraged me to reach out to people. I am excited to work on and lead more projects in the future."~ AR

Project Background

Food research and development is a dynamic environment with a strong reliance on water. About 27 million gallons of well water are used per year at JFB. General Mills is committed to improving the sustainability of water use throughout its supply chain. This project focused on developing a water balance for the facility and identifying opportunities to conserve water.

Incentives To Change

As a leader in the food industry, General Mills is dedicated to responsible water stewardship. The company is devoted to improving the sustainability of its water consumption throughout its supply chain. Each General Mills facility is committed to reducing its water consumption by 1% annually. This project focused on water conservation at the facility level.

save about 300,000 gallons of soft water per year, with an associated value of \$3,800. The high sodium concentration in the RO Reject would also reduce the need for sodium chloride in the brine tank.

Low Flow Nozzles

Currently, a 5.7 gpm nozzle is used to spray 180°F water during sanitation. Replacing the current nozzles with a 3.8 gpm low flow model would save approximately 38,000 gallons of water and 480 therms per year.

Aqueous Ozone Sanitation

Ozone is a strong oxidizer, with powerful sanitizing properties. Integrating aqueous ozone into the sanitation process would reduce the chemical waste and water usage associated with the process. Savings quantifications are under investigation

Hand Sink Aerators

Changing the flow rate of the aerators on the hand sinks in the pilot plants from 1.85 gpm to 1.0 gpm would reduce the water used for hand washing by 46%. Replacing the aerators in the Blue Buffalo Pilot Plant alone would result in about 840 gallons of water and 2 therms of energy saved per year.

SOLUTIONS

RO Reject Recycling

Reject water from the Reverse Osmosis (RO) System could be reused in the backwash and brine steps in the regeneration of the water softeners on site. This would

Solutions

Upgrading Toilets

At JFB, 57% of the toilets are older 3.5 gpf models. Upgrading these toilets to dual flush (1.1/1.6 gpf) or single flush (1.28 gpf) models would save about 640,000 gallons of water and \$4,600 per year.

Optimized Free Chlorine Testing Process

The free chlorine testing process was optimized to reduce water use. The procedure was changed from requiring a water temperature of 55°F to running the water for 3-5 minutes before testing. Since achieving 55°F required running the water for about 1 hour, this will save 8,200 gallons of water and \$110 per year.

Stormwater Collection System

JFB has a rainwater collection potential of about 4 million gallons per year. Stormwater could be collected and stored in an empty 1-million-gallon tank in the older chiller plant to use for irrigation.



“Abby came into our facility where she developed a water-use budget, investigated the costs associated with our water, and conducted a study on water usage in our research and development areas. She worked hard to leverage internal and external resources and diligently pursued water conservation solutions. Abby and her MnTAP advisors added value by evaluating our existing program and ideating on innovative ways that we can reduce our water consumption. This was a very good experience and we were very impressed.”

~ Nathan Gruman, Safety & Environmental Lead

| Recommendation | Annual Reduction | Annual Savings | Status |
|---------------------------------|------------------------------|----------------|--------------------|
| RO Reject Recycling | 300,000 gallons | \$3,800 | Recommended |
| Low Flow Nozzles | 38,000 gallons 480 therms | \$700 | Recommended |
| Aqueous Ozone Sanitation | TBD | TBD | Proposed |
| Hand Sink Aerators | 840 gallons 2 therms | \$10 | Recommended |
| Upgrading Toilets | 640,000 gallons | \$4,600 | Recommended |
| Optimized Free Chlorine Testing | 8,200 gallons | \$110 | Implemented |
| Stormwater Collection | 1,600,000 gallons | \$3,000 | Future Opportunity |

MnTAP Advisor: Laura Sevcik, Pollution Prevention Specialist; Brent Vizanko, Associate Engineer