Dairy's pollution prevention team identified process improvement opportunities

Driven to look for opportunities to reduce its wastewater, Schroeder formed a pollution prevention team comprised of production personnel, warehouse workers, engineers, consultants and vendors to reduce waste and improve process efficiency.

Schroeder Milk Co., St. Paul, produces a variety of dairy and other beverage products. The family-run operation has been in business since 1884. At the time of this case study, Schroeder processed 90,000 gallons of milk daily and 8,000 gallons of orange juice weekly.

Motivated to Reduce Wastewater

In 1996, the public wastewater treatment facility was going to assess Schroeder with a $200,000 service availability charge (SAC). Driven to look for opportunities to reduce its wastewater, Schroeder formed a pollution prevention team comprised of production personnel, warehouse workers, engineers, consultants and vendors to reduce waste and improve process efficiency. MnTAP provided team training at the initial meeting to ensure that all team members understood the process and procedures of an effective team. Following the first meeting, MnTAP's role shifted to team facilitator, working with the team leader to make sure team goals were achieved.

Product Savings

Schroeder identified the following ways to reduce valuable product from becoming wastewater.

Process Changes

Due to increased production, Schroeder needed to install a second pasteurizer. Dedicating this pasteurizer exclusively to white milk reduced the number of changeovers between chocolate milk, white milk, orange juice and other beverages. This saved $180,000 in product annually and 8,600 gallons of water a day.

Additionally, an anti-foam ingredient was added to the chocolate milk to prevent foam overflow as the milk moved through the storage silo. Reduced product loss resulted in annual savings of $187,000.

Small Leaks Add Up

Improved maintenance and tightening up existing systems significantly reduced product loss and water use. Repairing leaking connections, valves and hoses resulted in 5,086 gallons of water and 1,440 gallons of product saved daily.

Turn It Off

The team identified processes that unnecessarily used a continuous water flow and recommended changes.

The washer for cleaning the cases holding Schroeder's returnable cartons ran continuously. A valve was added so the spray bar would run only when cases were present. This saved 2,400 gallons of water a day.

In another area of the plant, cartons occasionally got stuck, tore open, and clogged the conveyor of the carton filling machine. To wash the spilled milk off the machine, a spray nozzle was left open all day. Schroeder changed this to only trigger when a carton got stuck. This saved 7,000 gallons of water a day.

Use Less

The team identified three processes where water use could be cut without affecting product quality.

Reducing the sanitizing stage in the clean-in-place tank, a system for cleaning plumbing without requiring its disassembly, from four minutes to three saved 1,250 gallons of water a day.

By following the manufacturer recommendation to reduce the water flow in the separator bowl, a centrifuge that separates cream from milk, from 180 gallons per hour to 30, saved 3,000 gallons of water a day.

Replacing shower heads and spray bars with smaller nozzles and mist sprays, on the carton washer, and running only when needed saved 5,340 gallons of water a day.

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Reuse It

Schroeder identified many opportunities for recirculating water and chemicals, instead of immediately discharging them down the drain.

Excess water from cleaning returnable plastic cartons was sent to the washer that cleans the cases that hold them. This reduced the total amount of fresh water, chemicals, and heat needed, saving 4,200 gallons of water a day.

Expired milk returned to Schroeder was sent out for reuse as animal feed instead of pouring it down the drain. This reduced the biochemical oxygen demand (BOD) and chemical oxygen demand (COD) loading to the wastewater treatment facility by 300 pounds a day.

The filling machines had been cooled with water used only once. Schroeder switched to a recirculating water system. This saved a total of 10,000 gallons of water a day.

In the sanitizing stage of the clean-in-place tank's operation, the chlorine rinse was replaced with an acidic one. The acidic rinse was recollected and used as prewash for the next cleaning cycle. This saved 100 gallons of chemicals and 500 gallons of water every day.

Benefits

Using a pollution prevention team, Schroeder Milk Co. identified opportunities for process improvement. According to Carl Schroeder Jr., over $400,000 and 13 million gallons of water are saved every year. In the process, Schroeder become a cleaner, more competitive facility.

For More Information

MnTAP has a variety of technical assistance services available to help Minnesota businesses implement industry-tailored solutions that maximize resource efficiency, prevent pollution, increase energy efficiency, and reduce costs. Our information resources are available online at <mntap.umn.edu>. Please call MnTAP at 612.624.1300 or 800.247.0015 for personal assistance or more information about MnTAP's services.