Reducing Waste at Kemps Ice Cream Plant

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Company Background

- Name: Kemps Ice Cream
- Location: Rochester, MN
- 200 employees
- 700,000 gallons of ice cream per week
Reasons for MnTAP Assistance

- High biochemical oxygen demand (BOD) levels in wastewater
- Daily reports show losses
- Gather information about ingredient loss in established processes
- Gain a better understanding of where waste occurs in the process
Overview

Goal: To make process change recommendations that will reduce liquid ingredient and product loss
Approach

• Collected data using tank inventory differences
• Collected rinse samples from dairy trucks
• Observed cleaning processes on post-pasteurization side of plant
• Collected samples of Clean In Place (CIP) pre-rinses for many types of processes
Tank Calibration

**Recommendation: Calibrate tank gauges**

- Loss reports will be more accurate
  - Resources can be spent more efficiently
- Can double-check amounts brought in by truck

**Variance = Raw tank weight difference - Scale Ticket Weight**

- Correction needed for dairy ingredients for water used to rinse trucks
Dairy Truck Intake

• Water used to rinse dairy trucks may still be cloudy after diverted to drain

• Negligible product loss occurs EXCEPT when:
  • Cream comes from more than 2 hours away
  • Whey settles in truck and clogs filter

Recommendation:
• Standardize unloading procedures
• Continue minimizing high loss situations
Sugar Truck Intake

• Liquid sugars are brought in by a pump provided by individual trucks
• Connecting hose is full of sugar when pumping is complete and goes to waste
• System is more prone to leakage

Recommendation: Add existing sugar pump to the truck bay

Savings: 10 gallons per load, 112,000 lbs or $23,000 of sugar per year
Compressed Air System

• Compressed air system has several drains to prevent buildup of water
  • Two float drains
  • Two timed drains
  • Five open drains
  • One manually opened drain

• When drains are open long enough to leak air, electricity is being wasted

**Recommendation:** Replace timed, open, and manually opened air compressor drains with zero-loss air drains

**Savings:** 256,000 kWh, or $24,300 in electricity costs
## Recommendations

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Product Savings</th>
<th>Energy Savings</th>
<th>Adjust Annual Savings*</th>
<th>Implementation Costs</th>
<th>Payback Period</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar pump</td>
<td>112,000 lbs of sugar</td>
<td>N/A</td>
<td>$22,620</td>
<td>$54,260</td>
<td>2.4 years</td>
<td>Recommended</td>
</tr>
<tr>
<td>Air compressor drains</td>
<td>N/A</td>
<td>256,000 kWh</td>
<td>$24,300</td>
<td>$1,000**</td>
<td>0.5 months</td>
<td>Recommended</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>112,000 lbs</strong></td>
<td><strong>256,000 kWh</strong></td>
<td><strong>$46,920</strong></td>
<td><strong>$55,260</strong></td>
<td><strong>1.2 years</strong></td>
<td><strong>Recommended</strong></td>
</tr>
</tbody>
</table>

*Adjusted Annual Savings includes annual operating costs for a new sugar pump

** Estimated cost
CIP Pre-Rinse Data

- Product lines show biggest potential for savings
- Yogurt receiving lines and raw blend lines could be water-flushed better
- Stations have more mix loss on the cleaning floor
- More testing needs to be done in order to draw conclusions
Future Opportunities

• Install a PIG system to clean 120 ft. of piping between pasteurized tanks and the flavor vats

• Potential Savings: 16,500 gallons of mix will go to finished product instead of rework per year
Personal Benefits

• First time in a manufacturing plant setting
• Created and conducted experiments independently
• Had to be flexible, patient, and creative in problem solving
• Met new people with different backgrounds
Thank you for your time!