Energy and Water Reduction
CSM Bakery Products

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Company Overview

• World’s leading supplier of bakery products
• 3 main areas of business
Motivations for Change

• Goal to reduce energy use by 15%
• Reduce operating costs
• Decrease water consumption
• Improve the environment
Approach

- Observed production and sanitation processes
- Noted ideas for improvement
- Worked with sanitation staff to test ideas
- Reworked ideas based on test results
Finding Opportunities

• Notes taken during observations
• Opinions and suggestions of staff
• Research of common solutions
• Test results
Opportunity #1

• Employee practices
• Wasted water
• High water strength
• Simple solution: Training program
Opportunity #2

• Outdated faucet aerators
• Many still 2.2 gpm
• Estimated 1.6% of water use
• Idea: Low flow aerators
Opportunity #3

- Overused hoses
- Estimated 47% of water use
- Water wasted
- Idea: Low flow hose nozzles
Opportunity #4

- Kettle room cleaning procedure
- 11% of water use
- 7% of energy use
- Wasted water and energy
Kettle Room Solution

• Optimize SSOP and training
• Change filling and draining
• Reduce water by 87.5%
• Reduce energy by 96%
• More effective cleaning
Successful Process Changes

• Employee training program
  – Save money on water
  – Reduce water strength charges

• Kettle room cleaning procedure
  – Hundreds of thousands of gallons of water
  – Thousands of dollars on energy
  – Thousands of dollars on chemicals
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Annual Reductions</th>
<th>Implementation Cost</th>
<th>Annual Savings</th>
<th>Payback Period</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Water conservation training program</td>
<td>Needs analysis</td>
<td>N/A</td>
<td>Needs analysis</td>
<td>Immediate</td>
<td>Needs analysis</td>
</tr>
<tr>
<td>2. Replace hand washing faucet aerators with low flow model</td>
<td>Gallons: 92,000, Therms: 650</td>
<td>$25</td>
<td>Water: $400, Energy: $460</td>
<td>&lt; 1 month</td>
<td>Recommended</td>
</tr>
<tr>
<td>3. Replace hose nozzles with low flow model</td>
<td>Gallons: 950,000, Therms: 6,200</td>
<td>$3,200</td>
<td>Water: $4,100, Energy: $4,400</td>
<td>5 months</td>
<td>Delay Implementation</td>
</tr>
<tr>
<td>4. Change kettle room SSOP</td>
<td>Gallons: 760,000, Therms: 9,100</td>
<td>N/A</td>
<td>Water: $3,300, Energy: $6,400</td>
<td>Immediate</td>
<td>Continue Testing</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Water Conservation Options</td>
<td><strong>1.8 million gallons water</strong></td>
<td>$3,225</td>
<td><strong>$7,800</strong></td>
<td>5 months</td>
<td>22% of facility water use</td>
</tr>
<tr>
<td>Energy Conservation Options</td>
<td><strong>15,950 therms</strong></td>
<td>N/A</td>
<td><strong>$11,260</strong></td>
<td>Immediate</td>
<td>11% of facility gas use</td>
</tr>
</tbody>
</table>
Future Ideas

• Electro-chemically activated (ECA) water
  – Replaces all chemicals
  – Non-toxic
  – Non-corrosive
  – One time investment: $25,000
  – Chemical costs: $54,000/year
Future Ideas

• Dry ice blasting
  – Uses no water or chemicals
  – EPA, FDA, USDA approved
  – No residue or secondary waste
  – Effective sanitizer
  – Possibility for frozen department
Personal Benefits

• Industrial experience
• Confidence
• Knowledge
Questions?