Water Conservation at Aveda Corporation

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Company Background

Aveda Corporation

- World headquarters in Blaine, MN
- 750 employees
- Division of Estée Lauder Companies
- Production, marketing, and research for personal care products
- Ethically source natural ingredients
- Environmentally friendly culture
Project Overview

Water Conservation Initiatives

• Facility water mapping
• 22 million gallons per year
• 25% cleaning
Approach

Data Collection

• Analyzing water meters
• Observation of CIPs and manual sanitization room
• Flow rate measurements
• Talking with workers
• SAP reports
Primary Recommendation

Purified Water System Upgrade and Waste Stream Reuse

• Production bottlenecks → need higher flow system
• New carbon filter, dual pass RO membranes, deionizer, and ozone generator
  • 70% to 90% efficiency
  • Redundant system
• Storage system for waste streams and pump to nearby bathrooms
  • RO reject, softener discharge, autoclave discharge
  • Potential first pass cooling
Dual Pass Schematic

Make Up Water

First Pass RO

First Pass RO

Permeate

Permeate

RO Reject

Recovery Permeate

Recovery RO

Reject to Drain

Storage Tank
## Primary Recommendation Analysis

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Annual Reduction</th>
<th>Total Cost</th>
<th>Annual Savings</th>
<th>Payback Period</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purified Water System Upgrade</td>
<td>1.46 million gallons 32,000 kWh 11,000 lbs NaOH</td>
<td>$667,000</td>
<td>$7,700 &gt;$3,200 $26,000 + increased capacity</td>
<td>18 years</td>
<td>Recommended</td>
</tr>
<tr>
<td>Waste Stream Reuse</td>
<td>1.25 million gallons</td>
<td>&lt;$203,000</td>
<td>$6,600 + ability to expand reuse</td>
<td>&lt;30 years</td>
<td>Recommended</td>
</tr>
</tbody>
</table>
## Additional Solutions

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Annual reduction</th>
<th>Total cost</th>
<th>Annual savings</th>
<th>Payback period</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>New nozzles on pre-rinse bucket washer</td>
<td>640,000 gallons 3,400 therms 31,000 kWh</td>
<td>$664</td>
<td>$3,400 $2,100 $3,200</td>
<td>&lt;1 month</td>
<td>Implemented</td>
</tr>
<tr>
<td>New spray nozzles in storage tanks</td>
<td>544,000 gallons 3,300 therms 28,000 kWh</td>
<td>$30,000</td>
<td>$5,800 $2,500 $2,800</td>
<td>2.7 years</td>
<td>In Progress</td>
</tr>
<tr>
<td>Temperature probes in recycle line</td>
<td>247,000 gallons 24,000 lbs detergent</td>
<td>$37,000</td>
<td>$2,400 $23,000</td>
<td>2.5 years</td>
<td>Recommended</td>
</tr>
<tr>
<td>New cleaning method with new spray nozzle</td>
<td>629,000 gallons 37,000 lbs detergent</td>
<td>Unknown $6,000 $34,000 + 256 batches</td>
<td>Unknown</td>
<td>Investigating</td>
<td></td>
</tr>
<tr>
<td>Add VFD pump to RO train</td>
<td>24,500 kWh</td>
<td>$4,600</td>
<td>$2,500</td>
<td>1.8 years</td>
<td>In Progress</td>
</tr>
<tr>
<td>Countercurrent water softener</td>
<td>692,000 gallons 78,000 lbs salt</td>
<td>$64,000</td>
<td>$3,700 $8,000</td>
<td>7.3 years</td>
<td>Recommended</td>
</tr>
</tbody>
</table>
Takeaways

• Information is dispersed
  • Self-start

• Investigate all angles
  • Plugged hair color tank