Water Conservation
Michael Foods – Northern Star Co.
Alex Hoppes
Advisor: John Polanski
Company Overview

• Northern Star Company is a division of Michael Foods
• Produce potato products for retail and food service needs
Motivations for Change

• Water usage has been on the rise
• Limited by well usage
  – Cannot expand without cutting current usage
  – Efficiency declines
• Not deplete aquifers for surrounding area
Overview

• While water is used all over the plant, certain processes require much more than others
  – Raw/Receiving
  – Peel Floor
  – Clean Room
Thought Process

• Steps:
  – Visual Check
  – Operation manual
  – Operators/Supervisors
Potato Washer

- Constantly overflowing
- The water level was set at 28 inches
- Found process to be efficient at 26 inches
Reverse Osmosis Reject Water Reuse

- Facility houses an RO system to purify water for the boiler feed
- The reject water is collected and used for the potato washer and a peeler exhaust tank
Pump Tank Auto Fill Valves

- Currently have manually operated fill valves
- Tanks constantly overflow
- Valve runs at close to 50 gallons per minute
- Potential savings of 4.2 million gallons
Surge Bin Fill Levels

• The bins do not need to be filled entirely since potatoes displace the water
• There should be an optimal level to fill the bins based on poundage entering
Peeler Exhaust

- Used to run 40-50 seconds

- The spray time was found to be more effective at 30 seconds
Reusing Scrubber Water

• This capital project would need:
  – Tested screening device
  – Grinder pump
  – Water storage tank
  – Centrifugal pump
  – Piping

• Main objective: Turn water intensive process into a semi-closed loop system
Basket Washer

• Constantly overflowing
• Measured rate of over 20 gallons per minute if the valve is open wide
• Missing float
• Operator must keep valve cracked
Replaced Solenoids

- Peeler 2 exhaust tank
- Helisieve in waste room
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Water Saved (per year)</th>
<th>Net savings (per year)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repair broken solenoids</td>
<td>1.4 million gallons</td>
<td>$6,000</td>
<td>Completed</td>
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<tr>
<td>Replace basket washer float</td>
<td>6.7 million gallons</td>
<td>$29,000</td>
<td>Completed</td>
</tr>
<tr>
<td>Reduce peeler spray time</td>
<td>93,000 gallons</td>
<td>$400</td>
<td>Completed</td>
</tr>
<tr>
<td>Reduce potato washer water level</td>
<td>2.8 million gallons</td>
<td>$12,000</td>
<td>Completed</td>
</tr>
<tr>
<td>Reuse RO reject water</td>
<td>5.25 million gallons</td>
<td>$22,600</td>
<td>Completed</td>
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</tbody>
</table>
# Summary

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Water Saved (per year)</th>
<th>Net savings (per year)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reuse scrubber water</td>
<td>8.25 million gallons per scrubber</td>
<td>$35,000 per scrubber</td>
<td>Recommended</td>
</tr>
<tr>
<td>Install auto fill valves on pump tanks</td>
<td>4.2 million gallons</td>
<td>$18,000</td>
<td>Recommended</td>
</tr>
<tr>
<td>Optimize surge bin water level</td>
<td>1.9 million gallons</td>
<td>$8,300</td>
<td>Recommended</td>
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</table>
## Totals

<table>
<thead>
<tr>
<th>Water Conservation (Completed)</th>
<th>Water Saved (per year)</th>
<th>Net savings (per year)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>16.25 million gallons</td>
<td>$70,000</td>
</tr>
<tr>
<td>Water Conservation (Recommended)</td>
<td>14.35 million gallons</td>
<td>$62,000</td>
</tr>
<tr>
<td>Total</td>
<td>30.6 million gallons</td>
<td>$132,000</td>
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</tbody>
</table>
Personal Benefits

- Hands on experience in an industry
- Working with all levels of employees
- Being in charge of a project
- Making a difference
Questions?