Heating to Cooling Transition Kaizen

01/05/10 – 01/07/10
Team Members

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Kaizen Does...

• Document that many processes are “tribal” – unwritten and undocumented
• Increase awareness of the function and value of all roles
• Break down “silos” within and between departments and divisions
• Challenge the prevailing winds
Goal

• Reduce cycle time 50%
• Improve customer satisfaction
Process Lessons Learned

• Folks nervous about early start breaking coils
• No such thing as an “average” time to start
• No formal process for planning & communicating transition
• Glycol process – expensive, labor intensive, higher risk solution
Three recommendations

• Unified start time Spring/Fall

• Set and post conversion schedule, updated daily

• Limit the use of Glycol
Issue – who says go?

• Each District does their own thing

• Too early – cracked coils

• Too late – sweaty students
S.T.A.R.T. at the Beginning

• EM already monitors weather for energy purchases, etc.

• Look at forecasts and pick a date

• Issue S.T.A.R.T. Memo
Issue – where are we at?

• What are the priorities?

• When will my building be done

• Angry customers
Communicate Plan

- Each District submits conversion plan
- Post on FM website
- Update daily
Conversion Plan on Web

East Bank District Heating-to-Cooling Conversion Plan

Check the date your building's cooling system is scheduled to be on.

Status Color Code:
- **On**
- **In Progress**
- **Not started**

<table>
<thead>
<tr>
<th>Building Name</th>
<th>Building #</th>
<th>Date Central Cooling On</th>
<th>Status</th>
<th>Date Window A/C Units installed</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burton Hall</td>
<td>8</td>
<td>03.16.10</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Eddy Hall</td>
<td>1</td>
<td>03.11.10</td>
<td>03.15.10</td>
<td>03.15.10</td>
<td></td>
</tr>
<tr>
<td>Nicholson Hall</td>
<td>4</td>
<td>03.15.10</td>
<td>03.15.10</td>
<td>03.15.10</td>
<td></td>
</tr>
<tr>
<td>Pattee Hall</td>
<td>3</td>
<td>03.11.10</td>
<td>03.15.10</td>
<td>03.15.10</td>
<td></td>
</tr>
<tr>
<td>Pillsbury Hall</td>
<td>2</td>
<td>03.12.10</td>
<td>03.20.10</td>
<td>03.20.10</td>
<td></td>
</tr>
<tr>
<td>Wesbrook Hall</td>
<td>10</td>
<td>03.10.10</td>
<td>03.20.10</td>
<td>03.20.10</td>
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<tr>
<td>Wulling Hall</td>
<td>5</td>
<td>03.12.10</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
Issue - Glycol

- Expensive
- Corrodes coils
- Caustic chemical
- Glycol process physically difficult & time consuming
Limit Glycol Use

• Shift to air dry or load pump
• Environmentally friendly
• Improve customer satisfaction
• Save money
# Business Case Numbers

<table>
<thead>
<tr>
<th>Description</th>
<th>Initial Cost ($)</th>
<th>On-going cost ($)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Implementation Cost:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conversion of 514 cooling coils from glycol to air dry capability</td>
<td>$1,542,000</td>
<td>$0</td>
<td>Range from $2-4K/coil</td>
</tr>
<tr>
<td>Conversion of coils from glycol to load pump capability</td>
<td>TBD</td>
<td></td>
<td>Roughly 2x the cost of air dry (additional labor savings, but added energy cost)</td>
</tr>
<tr>
<td><strong>Conversion Cost</strong></td>
<td>$1,542,000</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cost savings ($)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recurring Savings:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Labor savings (3,000 – 4,700 hours per year)</td>
<td>$260,000</td>
<td></td>
<td>50-80% reduction in labor expenses ($190-$300K)</td>
</tr>
<tr>
<td>Materials savings – glycol purchase</td>
<td>$45,000</td>
<td></td>
<td>100% reduction ($45K/yr). Saves additional admin time from ordering, receiving, and delivering</td>
</tr>
<tr>
<td><strong>Annual Savings</strong></td>
<td>$305,000</td>
<td>$0</td>
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</tr>
<tr>
<td><strong>ROI (payback period)</strong></td>
<td></td>
<td></td>
<td>5 years</td>
</tr>
</tbody>
</table>
Meeting the Challenge

Old process takes 6 weeks

New process takes 3 weeks