Leveraging Utility Performance with Effective Utility Management and Lean/Six Sigma

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Hillsboro, Oregon
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Clean Water Services
Transformative Business Model

- Business Strategy
- Balanced Scorecard Approach
Transformative Business Model

Effective Utility Management

Business Strategy
Balanced Scorecard Approach

Strategy Development
Where We Started
Where We Are Going

Pumps, Pipes, & Plants

Public & Environmental Health

Resource Recovery
<table>
<thead>
<tr>
<th>Rating</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>More Important</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>FV</td>
</tr>
<tr>
<td>2</td>
<td>PQ</td>
</tr>
<tr>
<td>1</td>
<td>CS, SS, OO</td>
</tr>
</tbody>
</table>

| CS    | Customer Satisfaction |
| ED    | Employee & Leadership Development |
| FV    | Financial Viability |
| IS    | Infrastructure Stability |
| OO    | Operational Optimization |
| OR    | Operational Resiliency |
| PQ    | Product Quality |
| SS    | Stakeholder Understanding & Support |
| SU    | Community Sustainability |
| WA    | Water Resource Adequacy |
Transformative Business Model

- Business Strategy
  - Balanced Scorecard Approach

- Program Service Levels
- Effective Utility Management

Strategy Development
Clean Water Services at a Glance

- Wastewater Collection and Treatment
- Surface Water Management
- Watershed Management

FLOW
TUALATIN RIVER IN 1959.

MATTERS
TUALATIN RIVER TODAY.

River Flow Management

Program Service Levels
Business Strategy

Vision & Mission

Partnerships
- Agriculture
- Community Programs
- Irrigation Districts
- Drinking Water Suppliers

Innovation
- Watershed Based Trading
- Natural Treatment System
- Native Plant Nursery

Resource Recovery
- Struvite Recovery
- Solar
- Cogen
- FOG
- Street Sweeping Recovery

Operational Excellence
- Lean Six Sigma
- Performance Visibility
- Enhanced Technology
- College of Clean Water

Voice of the Customer
Transformative Business Model

- Effective Utility Management
- Program Service Levels
- Financial Plan
- Balanced Scorecard Approach
- Business Strategy

Strategy Development
Financial Trend

Actual Expenditures (in 1,000's Dollars)

Fiscal Year

FY '90 FY '91 FY '92 FY '93 FY '94 FY '95 FY '96 FY '97 FY '98 FY '99 FY '00 FY '01 FY '02 FY '03 FY '04 FY '05 FY '06 FY '07 FY '08 FY '09 FY '10 FY '11 FY '12

$0 $10,000 $20,000 $30,000 $40,000 $50,000 $60,000 $70,000

6.2% Increasing Trend
Transformative Business Model

- College of Clean Water & Center of Business Excellence
- Effective Utility Management
- Program Service Levels
- Financial Plan
- Goals Share Award
- Performance Based Pay
- Balanced Scorecard Approach
- Business Strategy

Strategy Execution

Strategy Development
Business Process Re-engineering

First two years saved ratepayers over $13 million.
Sustaining Performance
Lean/Six Sigma

Actual Expenditures (in 1,000's of Dollars)

$0 $10,000 $20,000 $30,000 $40,000 $50,000 $60,000 $70,000

FY '90 '91 '92 '93 '94 '95 '96 '97 '98 '99 '00 '01 '02 '03 '04 '05 '06 '07 '08 '09 '10 '11 '12

Lean/Six Sigma

BPR

Strategic Investments in Watershed Health and Resource Recovery

Addition of Surface Water Programs

BPR w/o BPR
Washington County Population vs. CWS Staffing Levels

Population (in 1000's)

- 45 employees per 50,000 residents (366 FTE's)
- 29 employees per 50,000 residents (311.05 FTE's)

CWS Staffing

- 366.00 Budgeted FTE's in FY 1996-97
- 311.05 Budgeted FTE's in FY 2012-13

Lean /Six Sigma
Misaligned Metrics, Priorities, and Policies

- Waste & Loss
- Inefficiency
- Defects/Re-do’s
- Non-value adding activities or investments
- Obstructions to optimal process
- Highly variable outcomes
Business Improvement Tools

Use the Right Tool for the Right Project

Six Sigma
Reduce process variation
Glitches, Rattles, Gaps, & Giggles

Idea Generator

Idea

Idea

Idea

Idea

Idea Filter

High Impact Projects

Does it have a direct, line of sight connection, to key EUM Attributes?
Lean Thinking

Reduce Wasted Time or Wasted Materials

- Flow-focused
- Less wasted time or materials improves efficiency and reduces cost
- Many small improvements
- Focus on “DOWNTIME”
DOWNTIME

- Defects
- Over-Production
- Waiting
- Not Using Tribal Knowledge
- Transportation
- Inventory
- Motion
- Extra Processing
<table>
<thead>
<tr>
<th>Category of Waste</th>
<th>Definition</th>
<th>Example in an office (non-manufacturing) environment.</th>
<th>Personnel Authorization Waste Eliminated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defects</td>
<td>The effort involved in inspecting for and fixing defects</td>
<td>Errors in data, invoices, customer orders, etc.</td>
<td>Reduced the number of steps (where errors could be introduced) from 15 to 7.</td>
</tr>
<tr>
<td>Overproduction</td>
<td>Production ahead of demand</td>
<td>Printing unneeded paperwork</td>
<td>Printing PAs for physical signatures</td>
</tr>
<tr>
<td>Waiting</td>
<td>Waiting for the next production step</td>
<td>Staff waiting for a resource (e.g. access to a computer application) to become available.</td>
<td>Payroll waiting for batched folders to be signed and returned</td>
</tr>
<tr>
<td>Not fully utilizing tribal knowledge</td>
<td>Failing to tap into the knowledge, skills, education and creativity of employees.</td>
<td>Not involving office staff in an attempt to improve a process.</td>
<td>Staff knew time card double entry of seven types was occurring</td>
</tr>
<tr>
<td>Transportation</td>
<td>Moving products that are not actually required to perform the processing</td>
<td>Receiving items in an area not close to where they will actually be used.</td>
<td>Walking to route batched folders</td>
</tr>
<tr>
<td>Inventory</td>
<td>All components, work in process and finished product not being processed</td>
<td>Messages and requests in email in-boxes.</td>
<td>Placing them in batched folders</td>
</tr>
<tr>
<td>Motion</td>
<td>People or equipment moving or walking more than is required to perform the processing</td>
<td>Looking for physical documents.</td>
<td>Placing paper-based PAs into batched folders</td>
</tr>
<tr>
<td>Extra (stupid) Processing</td>
<td>Performing unnecessary or incorrect processing.</td>
<td>Over-analyzing data.</td>
<td>Reduced the number of reasons for a PA from 13 to 7</td>
</tr>
</tbody>
</table>
Overproduction - Eliminated 46% of Types of PAs

<table>
<thead>
<tr>
<th>Personal Authorization Type</th>
<th>Eliminate</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hire</td>
<td>No</td>
<td>Requires Dept. Director Approval</td>
</tr>
<tr>
<td>Separation</td>
<td>No</td>
<td>Requires Dept. Director Approval</td>
</tr>
<tr>
<td>Family Medical Leave</td>
<td>Yes</td>
<td>Captured on Timecards</td>
</tr>
<tr>
<td>Promotion</td>
<td>No</td>
<td>Requires Dept. Director Approval</td>
</tr>
<tr>
<td>Leave Without Pay</td>
<td>No</td>
<td>Tracks Loss of Accruals</td>
</tr>
<tr>
<td>Worker’s Comp Paid Time Loss</td>
<td>Yes</td>
<td>Capture on Timecards</td>
</tr>
<tr>
<td>Employer Paid Time Loss</td>
<td>Yes</td>
<td>Capture on Timecards</td>
</tr>
<tr>
<td>Light Duty</td>
<td>Yes</td>
<td>Capture on Timecards</td>
</tr>
<tr>
<td>Return to Regular Duty</td>
<td>Yes</td>
<td>Capture on Timecards</td>
</tr>
<tr>
<td>Suspension Without Pay</td>
<td>No</td>
<td>Requires Dept. Director Approval</td>
</tr>
<tr>
<td>Holiday Without Pay</td>
<td>Yes</td>
<td>Capture on Timecards</td>
</tr>
<tr>
<td>Administrative Absence Without Pay</td>
<td>No</td>
<td>Requires Dept. Director Approval</td>
</tr>
<tr>
<td>Military Leave</td>
<td>Yes</td>
<td>Capture on Timecards</td>
</tr>
</tbody>
</table>
Six Sigma

Reduce Process Variation

- Problem-focused
- People centered process
- Based on data
- System outputs improved by reducing variability
Bio-P Six Sigma Project

- Reduce effluent phosphorus process variability
- Reduced alum and caustic use for chemical savings of $250,000 per year targeted.
- Increase production of Crystal Green by 20%.
- Develop transferable Bio-P knowledge to other utilities
Honoring our Past...Charting the Future

Celebrating 40 Years of Clean Water