Effective Operations Performance Management

Presented by:
Doug Spiers P.E., Esq.
Vice President

11/17/10
Total Quality Management (or TQM) is a management concept coined by W. Edwards Deming.

The basis of TQM is to reduce the errors produced during the manufacturing or service process, increase customer satisfaction, streamline supply chain management, aim for modernization of equipment and ensure workers have the highest level of training.

Total Quality Management (or TQM) is a management concept coined by W. Edwards Deming.
“Triple Bottom Line” – “TBL” or “3BL” or “People, Planet, Profit”

The phrase was coined by John Elkington in his 1998 book *Cannibals with Forks: the Triple Bottom Line of 21st Century Business.*
The term was coined by Dr. Kaplan and Dr. Norton in *The Balanced Scorecard*
Six Sigma focuses on improving quality by reducing the number of defects and impurities.

TQM tries to improve quality by ensuring conformance to internal requirements.
“Effective Utility Management” – The 10 Attributes
Strategic Framework for Success

“The Bottom Line”

Consultants Change

Measuring Performance Doesn’t
Strategic Framework for Success

Performance Management

Corrective Action (Act)

Vision
Mission
Goals

Strategic Plan (Plan)

Resources
Accountability

Implementation Plan (Do)

Procedures
Tools
Training
Execution

Communication

Performance Measures (Check)

Performance Management

8
Performance Management Basics

Questions:

• Do we have effective measures?
• Are we achieving our desired performance?
• Are we effectively communicating the results?
Performance Management Basics

Establish Objectivity:

- .357 Batting Average
- 18.2 Rebounds/Game
- 3:52 Mile
- 88 Bowling Average
- 52 Hit by Pitch
- 18 & 1
- 16 NBA Championships
Performance Management Basics

Sample Utility Benchmark Measures:

- 2.6 Customer Service Complaints per 1000 Customers
- 6.0 Technical Quality Complaints per 1000 Customers
- 1.4 Planned Disruption of Water Service (< 4 Hrs) per 1000 Customers
- 67% Planned Maintenance Ratio (Hrs)
- $269 O&M Cost per Account
- 33.6 H&S Severity Rate

Source: AWWA QualServe

How are We Doing?
Performance Management Basics

Three Areas of Measurement

Core Business
- $O&M/Mile
- CI Residual
- H&S Severity Rate
- % Customer Satisfaction
- Training Hours / Operator

Strategies
- # New customers
- % Recycled Delivered
- Energy Savings
- Water Conserved

Problem Areas
- # Vacancies
- $ Accidents
- Sick Time
- Overtime
“Not everything that can be counted counts, and not everything that counts can be counted.”

A. Einstein
Operational Performance Measures

Level of Service Measures

Customer Service – “Exceptional Service”

- On-site response to service requests within 2 hours
- Restore job site to equal or greater status
- Positive, respectful and effective customer communication

Public Health and Safety

- 100% compliance with State and Federal primary drinking water regulations
- 100% compliance with State and Federal effluent discharge standards
- Maintain 20 psi in emergencies for fire protection
Operational Performance Measures

Level of Service Measures

Fiscal Responsibility
- Maintain competitive rates - lower half of benchmarked group
- Execute planned CIP
- Meet total operating budgets

Employee Health and Safety
- Zero lost time injuries - “Everyone goes home at end of day”

Community Support
- Proactive community education, participation and support
### Operational Performance Measures

### Water Quality Measures

#### RESULTS CHART

<table>
<thead>
<tr>
<th>General Properties</th>
<th>Units</th>
<th>PHC (MCLQ)</th>
<th>MCL (MDL)</th>
<th>Level Found</th>
<th>Level Found</th>
<th>Level Found</th>
<th>Level Found</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloride &amp; Carbonate</td>
<td>mg/L</td>
<td>16.25-20</td>
<td>16-20</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Calcium &amp; Magnesium</td>
<td>mg/L</td>
<td>3.5-4</td>
<td>3-4</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Fluoride</td>
<td>mg/L</td>
<td>2.8-3.4</td>
<td>2.5-3</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Sodium &amp; Total Alkalinity</td>
<td>mg/L</td>
<td>11.9</td>
<td>12</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Sodium</td>
<td>mg/L</td>
<td>7.1-7.4</td>
<td>7-7.5</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>mg/L</td>
<td>24.43</td>
<td>20</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Iron &amp; Microbiological</td>
<td>mg/L</td>
<td>0.04</td>
<td>0.04</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Total Coliform Bacteria</td>
<td>Number of Samples</td>
<td>0%</td>
<td>0%</td>
<td>No more than 1 positive monthly sample</td>
<td>No more than 1 positive monthly sample</td>
<td>No more than 1 positive monthly sample</td>
<td>No more than 1 positive monthly sample</td>
</tr>
<tr>
<td>Total Coliforms</td>
<td>Number of Samples</td>
<td>0%</td>
<td>0%</td>
<td>No more than 1 positive monthly sample</td>
<td>No more than 1 positive monthly sample</td>
<td>No more than 1 positive monthly sample</td>
<td>No more than 1 positive monthly sample</td>
</tr>
<tr>
<td>Cryptosporidium</td>
<td>Number of Samples</td>
<td>0%</td>
<td>0%</td>
<td>No more than 1 positive monthly sample</td>
<td>No more than 1 positive monthly sample</td>
<td>No more than 1 positive monthly sample</td>
<td>No more than 1 positive monthly sample</td>
</tr>
<tr>
<td>Disinfection Byproducts</td>
<td>Action Level</td>
<td>Range</td>
<td>Lowest Running Annual Average</td>
<td>Range</td>
<td>Lowest Running Annual Average</td>
<td>Range</td>
<td>Lowest Running Annual Average</td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>mg/L</td>
<td>1.1</td>
<td>1</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Total Organic Carbon Removal Ratio</td>
<td>%</td>
<td>98%</td>
<td>98%</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Nitrogen (as N)</td>
<td>mg/L</td>
<td>0.06</td>
<td>0.06</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Total Halogenated Acids (THAS)</td>
<td>mg/L</td>
<td>0.2</td>
<td>0.2</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Total Inorganics</td>
<td>mg/L</td>
<td>0.2</td>
<td>0.2</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
<tr>
<td>Lead &amp; Copper</td>
<td>mg/L</td>
<td>15</td>
<td>15</td>
<td>Average</td>
<td>Range</td>
<td>Average</td>
<td>Range</td>
</tr>
</tbody>
</table>
Operational Performance Measures

Water Quality Measures

Treatment Plan Water Quality
• Raw water turbidity, pH
• Streaming current reading
• Settled water turbidity by clarifier (2-4 readings per plant)

Chemical Dosage
• Pre-chlorine Dose, Chlorine Dose
• CT Ratio (Clarifiers/Basin), Total CT Ratio
• Ozononation
• Alum Dosage

Efficiency
• Treatment Cost/MG Treated
Operational Performance Measures

Operational Measures

Flow Dashboard
• Plant Inflow, Plant Outflow
• Source Water Blend

Filter
• Runtime, Head Loss, Turbidity

Pipeline Information
• Flow and Pressure at Each Turn-out

Efficiency
• $O&M/MG Delivered
Operational Performance Measures

Asset Management Measures

CIP
- CIP Actual Expenditures vs. Planned
- % R&R vs. Total Replacement Cost
- Asset Depreciation Index
- Failure Rate, Breaks, Leaks

Preventive Maintenance
- Preventive Maintenance Completed on Time
- PM vs. CM in Hours
- PM vs. CM in $
- $ / PM Activity
A Performance Based Management System links the Strategic Goals to every Employee.
The Lost & Unaccounted for Water outcome is a combination of many factors.
Effective Reporting

<table>
<thead>
<tr>
<th>Activity</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valves Actuated</td>
<td>14</td>
<td>22</td>
<td>15</td>
<td>26</td>
<td>77</td>
</tr>
<tr>
<td>Hydrants Repaired</td>
<td>2</td>
<td>0</td>
<td>14</td>
<td>7</td>
<td>23</td>
</tr>
<tr>
<td>Hydrants Painted</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>56</td>
<td>70</td>
</tr>
<tr>
<td>Miles of Sewer Cleaned</td>
<td>14</td>
<td>17</td>
<td>12</td>
<td>16</td>
<td>59</td>
</tr>
<tr>
<td>Tanks Inspected</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Fleet Vehicles Washed</td>
<td>20</td>
<td>0</td>
<td>13</td>
<td>17</td>
<td>50</td>
</tr>
</tbody>
</table>

How are we doing??
Effective Reporting

Number of Water Quality Complaints/ Month

How are we doing??

Average
Set Appropriate Targets

Lost & Unaccounted For Water

Regulatory Guideline
Utility Target
Industry Standard
Best Practice

How are we doing??
“When you can measure what you are speaking about, and express it in numbers, you know something about it.

But when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind.”

Lord Kelvin