June 26, 2018

Asset Management
City of Wyoming – Focus on Workflow

Katie Erickson – City of Wyoming
Craig Heisel – Donohue
Background

- Asset Management Program Background
  - City of Wyoming
  - GAP Analysis
  - Goals
    - Policy/Strategy

- Asset Management Program Implementation
  - Workflow
  - Discussion
  - Next Steps
AM Program Overview
WHERE are we and WHO do we serve?

- A City of Vision and Progress
- 72,000 Residents
- Regional Water and Wastewater Service
- 2015 SAW Grant Recipient/2018 Grant Completion

City of Wyoming
Major Assets

- Clean Water Treatment Plant
- Water Treatment Plant
- Administrative Facilities
- Public Works

Boyne Mountain
City of Wyoming
Beginning Asset Management Completeness

1. Inventory and condition assessment - 30%
2. Level of Service - 75%
3. Criticality and BRE - 10%
4. O&M and Revenue - 50%
5. Long-term funding and CIP - 75%

Overall Asset Management Program - 40%
HOW did the City’s program evolve?

- **SAM GAP Analysis**
  - Determined current position
  - Clarified future vision
  - Developed a plan to fill in the GAPs

- **Standards Used**
  - Proposed NPDES permit language
  - WERF Strategic Asset Management (SAM)
  - PAS 55
WHAT was the baseline for our AMP?

SAM GAPs
- Explicit linkage of AMP to level of service
- Commitment
- Including AMP roles and responsibilities into the organizational structure
- Formally connecting risk assessment to AM decisions
- Training and professional development for staff on asset management

Program Focus
- Asset Management Program Structure
- Asset Information Management
- Asset Risk Management
- Operational Improvements
HOW are we organized (cross functional steering team)?

- **Realistic expectations**
  - Several years and lots of work/costs
  - Requires buy-in from all levels (asset management culture)
  - Up front investment (difficult to value initial ROI)

- **Focus on Value of program**
  - Culture of asset management
  - Improved asset reliability
  - Reduced lifecycle costs
  - Better value for dollar
  - Improved data management decision making
CAN we sustain a business case for asset management?

**Challenges**

- Uncovering value in the investment
- Organization buy-in and impact (culture)
- Managing expectations and competing interests
- Sustainability and continuous improvement

Life-cycle of asset management – temporary enthusiasms (Woodhouse, 2009).
Goals and Objectives
WHAT is the foundation of our program?

COW Guiding Principles

- Providing Optimum Customer Service
- High Quality Infrastructure Standards
- Community Aesthetics
- Stewardship of Resources
- Financial Stability

Strategic
- Leadership steering, organizational goals, policy

Tactical
- AM Teams, KPI’s, strategy, Asset Management Plan

Operational
- Departments, performance indicators, SOPs

Financial Stability

COW Guiding Principles
WHAT are our goals?

City of Wyoming Sustainability Statement
- The advancement and promotion, with equal priority, of environmental quality, economic strength and social equity so that stable and vibrant community can be assured for current and future generations.

Goals and Vision
- Decisions that are based on data, sound principles and an ethical framework
- Infrastructure that is up-to-date, reliable and suited for purpose
- Regulatory compliance
- A reputation for high quality and responsive customer service
- Active transparency where citizens and customers are informed and involved
- Highest regard for the health and welfare of our population
- Economic growth and vitality
- Rates that are stable and affordable
WHAT was the baseline for our AMP?

- Consider alignment with other initiatives
- Consequence of Failure
  - Environmental obligations
  - Energy
  - Safety
  - Management/personnel

<table>
<thead>
<tr>
<th>TBL Factor</th>
<th>Objective</th>
<th>KPI</th>
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<tbody>
<tr>
<td>Environment</td>
<td>Maintain regulatory compliance</td>
<td># of NPDES Violations</td>
</tr>
<tr>
<td>Social</td>
<td>Ensure public health and safety</td>
<td># of injuries illnesses</td>
</tr>
<tr>
<td>Economic</td>
<td>Rates that are affordable</td>
<td>Rate increases do not exceed cost of living index</td>
</tr>
<tr>
<td></td>
<td>Assess real costs</td>
<td>Real costs related to actual services</td>
</tr>
</tbody>
</table>

- Likelihood of Failure
- Consequence of Failure
WHAT are some good resources?

- International Infrastructure Management Manual (IIMM)
  - 2006, updated 2011, updated 2015
  - Steps for asset management planning and implementation
  - ISO 55000 – alignment, life cycle, risks, decision making
- ISO 55000
WHAT is the difference between maintenance and asset management and HOW does it impact workflow?

- Difference between computerized maintenance management and asset management
  - Condition monitoring
  - Asset values
  - Residual life
  - Probability/Consequence of failure
  - Business risk and renewal strategy

- Utilize data and systems to analyze risk and performance based on risk and life cycle costs

- Identify indicators and manage performance at different levels

- Asset management is much more than just maintenance

From EPA Simple
HOW is the Public Works Workflow Affected (As-Was)?

**Data Management**
- PW2000
- Paper Files (Admin)
- REGIS
- Utility Database aka Water Book
- Pipeworks
- Vitals
- Restoration (Supervisor – DB6)
- Video Inspection Books and CDs
- Future Issue (Excel)
- Signs
- Service Requests
- Invoice

**Work Order (Triplicate)**
- Work Order Review
  - Pipe Works
  - Future Issues
  - Vitals
  - Invoice
- Admin enters information in databases
- Inventory
- Restoration

**Process Flow**
- Work Scheduling By Supervisor
- Inventory Check
- Work Executed
- Work Order Completed

**Time to Time Keeping Process**
- Admin enters information in databases
- Inventory
- Restoration
- Invoicing (as necessary)

**Legend**
- Database
- Manual Paper Process
- Regional GIS

**Consolidate/replace existing databases (more than 10)**
- Reduce paper and manual processes
- Improve Inventory Management
- Allocate costs to assets
- Improve timekeeping

**GIS Updates**
- Capital Planning
- R&R Planning
HOW is the Public Works Workflow Affected (Work Order)?

<table>
<thead>
<tr>
<th>Labor</th>
<th>HOURS</th>
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<tbody>
<tr>
<td>S. Sipes</td>
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<tr>
<td>V. Miller</td>
<td>5</td>
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<tr>
<td>H. Hallas</td>
<td>5</td>
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<tr>
<td>D. Downs</td>
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<table>
<thead>
<tr>
<th>Equipment</th>
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<tbody>
<tr>
<td>UNIT NO.</td>
<td>IN</td>
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<tr>
<td>619</td>
<td>5</td>
</tr>
<tr>
<td>620</td>
<td>5</td>
</tr>
<tr>
<td>526</td>
<td>5</td>
</tr>
<tr>
<td>537</td>
<td>5</td>
</tr>
</tbody>
</table>

**Job-site Paperwork**
- Hours/Overtime/Lunch check
- Equipment
- Materials
- Staff
- Notes
- Budget Codes
- Add Ons

**Paper WO System/WO for each task**

**Limited records and mapping**

**Allocates Costs to budgets not assets**

**Process managed by administration/Time accounted for manually**
HOW is the Public Works Workflow Affected (To-Be or Almost-Is)?

Staff Assignments
- Historical Data
- BS&A (meters)
- Video Inspections
- REGIS (mapping)
- On-Base

Service Requests
- CMMS

Work Order
- CMMS
- Work enters list and prioritized
- CMMS
- Work Scheduled
- CMMS
- Inventory Checked
- CMMS

Work Executed
- CMMS

Work Order Completed
- CMMS

Time to Time Keeping Process
- Invoicing (as necessary)

Legend
- GIS
- Manual Paper Process
- Computerized Maintenance Management
- Mobile Device
- Existing Access Database

CMMS
- Updated Process
- Processes Maintained

Consolidate/replace existing databases (more than 10)
- Reduce paper and manual processes
- Improve Inventory Management
- Allocate costs to assets
- Improve timekeeping
- Leverage Mapping
HOW difficult is it to manage people’s time?

- 27 time codes
- Union Rules for overtime/lunch
- More than 100 permutations of time codes/multipliers
- Multiple job descriptions
- Communicated to finance (export to LOGOS for payroll was developed by City IT)

Historical Workflow:

- WO’s Time Entry in Field
- Time Verified by Supervisor
- WO’s Entered into Database by Admin
- WO’s Checked Against Time Cards
- Report Verified and Sent to AP

Updated Workflow:

- Time Applied to WO in CMMS
- Time Verified by Reports
- Report Verified and Sent to AP

Developed System to Enter Time In CMMS
- Allocate costs to assets
- Decrease admin
- Improve data management

Legend:
- CMMS: Computerized Maintenance Management
- Manual Paper Process
- Mobile Device
- Existing Access Database
HOW is the CWP Workflow Affected?

1. Work Order Request (CWP and Lift Stations)
   - PM Task

2. Supervisor approves Work Request
   - Work order created
   - Work order prioritized
   - Work scheduled

3. Check Inventory
   - Execute Work Order
   - Supervisor Approves WO
   - Work order is closed by Supervisor

4. Purchasing
   - Vendor Costs in System

5. Process Maintained
   - New Process

Legend:
- CMMS: Computerized Maintenance Management
- SCADA
- Manual Paper Process
- Mobile Device

New Processes Maintained:
- Replace Existing MP2/Update Registry
- Coordinate Time Keeping with PW
- Integrate Condition Based Maint.
- Integrate Inventory Management
- Maintain Work History and Document Management
Discussion and Next Steps
WHAT updates were made to the asset registry?

- Use asset registry as base line
- Provide a foundation for maintenance needs, staffing, repair/replacement
- Incorporated inventory management connecting parts to assets

<table>
<thead>
<tr>
<th>Model Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
</tr>
<tr>
<td>Year Installed</td>
</tr>
<tr>
<td>Useful Life</td>
</tr>
<tr>
<td>Assessed Life</td>
</tr>
<tr>
<td>PM Costs</td>
</tr>
<tr>
<td>CM Base Multiplier</td>
</tr>
</tbody>
</table>
HOW can mapping be leveraged?

Prior to implementation
- Paper maps
- REGIS not fully utilized
- Focus on address/budgets not assets
- Difficult to use data

Implementation
- Asset focused/Allocate costs to assets
- Move to condition based
- Work history available
HOW do we manage all of the data?
Peter Drucker “If you can’t measure it, you can’t manage it”

Separate (But Equally Important) Databases

- SCADA Historian
- Operations Database
- Finance and Accounting
- Computerized Maintenance Management
- Other Databases

Operational performance
Condition based maintenance

Data Management Software (e.RIS)
- Enterprise Environment
- Data Entry/Storage
- Data Brokering
- Mobility

Data brokering tools (Crystal/eRIS)
Communicate among various systems
Integrate maintenance project planning
Tools to support continuous improvement
WHAT information can be made available?

Operations data from SCADA

Lab Data

Work Order Data
Condition Based Maintenance

- Scheduled report as an option
- Equipment run hours in SCADA historian are compiled in a daily report
- Daily report is consumed by maintenance management system.
- Run hours are accumulated in maintenance management system and PMs are triggered
HOW does maintenance performance affect process performance
“Control the whole by controlling the parts”

**Blowers Run Times with Effluent BOD**
2018-Jun-07 to 2018-Jun-16

- Effluent BOD (Lab)
- Blowers (SCADA)

**Goal is to Manage Performance by Unit Process**

**We Can Use Data Brokering Tools to Manage Performance**

**We Can Use Data Brokering Tools to Manage Performance**
How can we plan capital improvements?
How can we plan capital improvements?

PROJECTS ADDED TO CIP SCENARIOS

MULTI-YEAR VIEW
HOW do we roll up risk capital report?

CWP - Risk Register- 2018

Assets at Risk

<table>
<thead>
<tr>
<th>Asset Description</th>
<th>Risk</th>
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</thead>
<tbody>
<tr>
<td>Cold Generator (Trane)</td>
<td>8</td>
</tr>
<tr>
<td>Wayne Sump Pump</td>
<td>8</td>
</tr>
<tr>
<td>Thickener Sludge Pump #2</td>
<td>9</td>
</tr>
<tr>
<td>Thickener Sludge Pump #1</td>
<td>9</td>
</tr>
<tr>
<td>Ups Power Supply Tower</td>
<td>9</td>
</tr>
<tr>
<td>Final Tank Clarifier #2</td>
<td>10</td>
</tr>
<tr>
<td>Level Meter (West)</td>
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</tr>
<tr>
<td>Level Meter (East)</td>
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<tr>
<td>Hs04 Chemical Storage Tank</td>
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<tr>
<td>Chemical Feed Pump-Caustic Soda-North</td>
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<tr>
<td>Chemical Feed Pump - Caustic Soda-South</td>
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<tr>
<td>Sodium Hypochlorite Chemical Feed Pump</td>
<td>15</td>
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<tr>
<td>Final Effluent Sampler</td>
<td>15</td>
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<tr>
<td>Ups Power Supplytower</td>
<td>15</td>
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<tr>
<td>Biosolids Truck Loading Flow Meter</td>
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<tr>
<td>Mixer</td>
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<tr>
<td>Effluent Submersible Sample Pump</td>
<td>25</td>
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<tr>
<td>East Centrifuge (Bird)</td>
<td>25</td>
</tr>
<tr>
<td>West Centrifuge (Bird)</td>
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<tr>
<td>Dechlorination Analyzer</td>
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</tr>
</tbody>
</table>

Measure and Monitor Risks
Develop Risk Register
HOW do we use risks to analyze improvements?

Planning Goals
- Environment
- Social
- Financial
WHAT are some next steps?

- Implement CMMS at Public Works
- Maintenance management
- Focus on continuous improvement
- Utilize data to drive decisions
  - Capital improvements
  - Maintenance management
  - Operations

<table>
<thead>
<tr>
<th>CM Resulting from PM</th>
<th>PdM</th>
<th>PM</th>
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<tbody>
<tr>
<td>15%</td>
<td>15%</td>
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<tr>
<td>35%</td>
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</table>
Thank You

Katie Erickson
ericksonK@wyomingmi.gov
Craig Heisel
cheisel@donohue-associates.com