Practical Matters: MSD’s Approach to Asset Management

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Gateway to Success
Practical Asset Management

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Summary

- MSD formed in 1954 and current service area encompasses 525 square miles around St. Louis, MO
- System includes:
  - Seven WWTPs for average 350+mgd treatment capacity
  - 9,517 miles of collection and trunk sewers and force mains
  - 278 pumping stations
Consent Decree and Collection System AM

• Consent Decree:
  • Entered into negotiated CD in 2012
  • Increase collection and treatment capabilities
  • 23 years, $4.7B effort to build improvements to address water quality and remove SSOs and abate CSOs
  • MSD started their AM journey as part of the CD
Why MSD Needs AM

Expedited or Delayed Spending

Proactive Plant Improvements

Accurate Data
Practical Asset Management

Focus on critical assets first!
### Roadmap to Success

- Asset Management will be phased into Operations over several years
- MSD in the driver’s seat for defining what Asset Management means to the organization
- Cross-departmental leadership team, but everyone at MSD has a role in the success of the program

#### Asset Management Roadmap to Success

<table>
<thead>
<tr>
<th>PHASE 1</th>
<th>Multi-Site Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where do you want to go?</td>
<td>• Establish AM Team</td>
</tr>
<tr>
<td>• Develop vision, goals, and objectives for asset management in Program Charter</td>
<td></td>
</tr>
<tr>
<td>• Align MSD and BC team on project vision, goals, and objectives Gap Analysis</td>
<td></td>
</tr>
<tr>
<td>Deliverables</td>
<td>Program Charter/AM Gap Analysis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PHASE 2</th>
<th>Management Expectations &amp; Asset Management Strategy, Plan, and Program Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do we need to get there?</td>
<td>• Prioritize Plant AM Implementation Plan</td>
</tr>
<tr>
<td>• Develop standardized templates for key program components</td>
<td></td>
</tr>
<tr>
<td>• Establish key asset management processes</td>
<td></td>
</tr>
<tr>
<td>• Develop communications plan</td>
<td></td>
</tr>
<tr>
<td>• Document processes for AM from initial asset acquisition through replacement</td>
<td></td>
</tr>
<tr>
<td>• Appropriate service levels and others goals to monitor asset performance</td>
<td></td>
</tr>
<tr>
<td>Deliverables</td>
<td>AM Implementation Plan/Program Templates/Key AM Process/Communications Plan/TAMP Implementation Plans</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PHASE 3</th>
<th>Plan and Program Implementation, and Field Coaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>How do we manage the journey?</td>
<td>• Implement coaching and information sharing plan to gain staff understanding buy-in and ownership</td>
</tr>
<tr>
<td>• Monitor appropriate KPIs to gauge program progress and success</td>
<td></td>
</tr>
<tr>
<td>• Assist with gap closure and implementation (asset priority, condition, and risk)</td>
<td></td>
</tr>
<tr>
<td>Deliverables</td>
<td>Tactical AM Plans/Progress reports/Summary status reports/Updated AM implementation plan/Training materials</td>
</tr>
</tbody>
</table>
Phase 1: Charter, Training and Gap Analysis
Phase 1: **YEAR 1**

- Established the Asset Management Team (AMT) to establish goals and objectives for AM at MSD
- AMT defined what AM means to MSD
- Conducted a gap analysis to determine current state of AM at each plant
AM Charter

- Describes where MSD wants to go with Asset Management
- Developed by Asset Management Team
- Copies posted at each facility
# Gap Analysis

<table>
<thead>
<tr>
<th>Strategic</th>
<th>Tactical</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Vision and Support</td>
<td>• Service Level Requirements and Performance Measures</td>
</tr>
<tr>
<td>• Resource Management</td>
<td>• Inventory &amp; Asset Profile</td>
</tr>
<tr>
<td>• Strategic Asset Management Plan</td>
<td>• Risk and Criticality</td>
</tr>
<tr>
<td>• Communication</td>
<td>• Condition Assessment and Monitoring</td>
</tr>
<tr>
<td>• Level of Service</td>
<td>• Operations Strategy</td>
</tr>
<tr>
<td>• Performance and Quality Management</td>
<td>• Maintenance Strategy</td>
</tr>
<tr>
<td>• Risk Management</td>
<td>• Renewal &amp; Replacement Strategy</td>
</tr>
<tr>
<td>• Engineering Design &amp; Construction</td>
<td>• Information Management</td>
</tr>
<tr>
<td>• Capital Planning &amp; Financing</td>
<td></td>
</tr>
<tr>
<td>• Business Case Evaluation</td>
<td></td>
</tr>
</tbody>
</table>
# Gap Analysis

## Category (Section)

<table>
<thead>
<tr>
<th>Category</th>
<th>Current Score</th>
<th>Target Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision and Support (3.1.1)</td>
<td>38</td>
<td>60</td>
</tr>
<tr>
<td>Resource Management (3.1.2)</td>
<td>34</td>
<td>60</td>
</tr>
<tr>
<td>Strategic Asset Management Plan (3.1.3)</td>
<td>33</td>
<td>60</td>
</tr>
<tr>
<td>Communication (3.1.4)</td>
<td>17</td>
<td>60</td>
</tr>
<tr>
<td>Level of Service (3.1.5)</td>
<td>28</td>
<td>60</td>
</tr>
<tr>
<td>Performance and Quality Management (3.1.6)</td>
<td>13</td>
<td>45</td>
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<tr>
<td>Risk Management (3.1.7)</td>
<td>13</td>
<td>60</td>
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<tr>
<td>Engineering Design &amp; Construction (3.1.8)</td>
<td>17</td>
<td>60</td>
</tr>
<tr>
<td>Capital Planning &amp; Financing (3.1.9)</td>
<td>28</td>
<td>60</td>
</tr>
<tr>
<td>Business Case Evaluation (3.1.10)</td>
<td>15</td>
<td>60</td>
</tr>
</tbody>
</table>

Weighted Gap
Initial Focus Areas From Gap Analysis

**Strategic**
- Risk Management
- Communication
- Levels of Service

**Tactical**
- Condition Assessment and Monitoring
- Risk and Criticality
- Inventory and Asset Profile
- Maintenance Strategy
Phase 2: SAMP, Templates, and Roadmap
Phase 2: **YEAR 1**

- Strategic Asset Management Plan (SAMP)
- Standardized templates for AM elements that matter most to MSD
- Key AM processes and performance metrics
- Communication and Engagement Plan
SAMP

- AMT approved approach for direction of the AM program
- Focus on consistency on the AM elements
- Aligns with the strategic goals of MSD
Standardized Templates

• Standard templates to promote consistency across MSD
• Promotes ‘apples to apples’ comparisons for planning and decision making

Risk
Consequence of Failure
Likelihood of Failure
Useful Life
Tactical Asset Management Plan
Maintenance Procedures
Standard Operating Procedures
TAMP Implementation Plan

• Interviewed staff at each facility
• Better understand how they are currently doing work in relation to SAMP
• Facility specific plan to ‘fill in the gaps’ during Phase 3 of the project

✓ Plant Assets
✓ Level of Service
✓ Risk Management
✓ Condition Assessment
✓ Maintenance Management
✓ Asset Needs
✓ Materials Management
Phase 3 Roadmap
Phase 3: Plan and Program Implementation
Phase 3: **YEAR 2/3 and Ongoing**

- Develop a TAMP for each plant
- Provide coaching, mentoring, and SME support during implementation
- Monitor program progress—what works well and what areas need to be adjusted
TAMPs

Facility specific plans have been developed to implement AM across MSD.
Facility Specific Implementation Plans

Figure 8-1: CT Implementation Schedule by Item Number

<table>
<thead>
<tr>
<th>ID #</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
</tr>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
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<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
</tr>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
<td>Q3</td>
<td>Q4</td>
</tr>
</tbody>
</table>

- **Section 4: Risk Management**
  - Refine list of critical CT assets
  - Using existing methodology, revisit the critical asset list and update list on an annual basis.
  - This information will be used to determine frequency of condition assessment, maintenance activities, and resource support.
  - Q1 2018, Q1 2019, Q1 2020, Q1 2021
  - Near Term and Ongoing
  - 40 hours
  - Plant Engineer and CT AM Group

- **Section 5: Risk Management**
  - Document existing and develop risk mitigation strategies
  - Document, develop, and/or update emergency response plans for CT critical assets and overall CT facility as required.
  - Developing risk mitigation strategies will allow staff to prepare and readily respond in the event of an emergency.
  - Q1 2018 and update as necessary
  - Near Term
  - 32 hours per plan
  - Division Manager

- **Section 6: Condition**
  - Continue collection of data
  - Apply the MEO condition assessment
  - The MEO condition assessment methodology.
  - Q1 2018, Q1 2019, Q1 2020
  - Quick Win and
  - 80 hours
  - Supervisor, Plant Engineer
MSD has formed several working groups to continue development of their program including the following:

- Maintenance Management Council
- Metrics and Dashboards
- Monetized Prioritization
- PM Program and Scheduling
- Condition Monitoring

Additional groups are formed as needed to tackle new initiatives.
Metrics and Dashboards

REGULATORY - BT

Select Year
2018

TSS Daily Reading
AUG
- YTD Near Misses: 0
- YTD Violations: 1
- Near Misses: 0
- Violations: 0

TSS Load Daily Reading
AUG
- Near Misses: 0
- Violations: 0

CBOD Daily Reading
AUG
- Near Misses: 0
- Violations: 0

CBOD Load Daily Reading
AUG
- Near Misses: 0
- Violations: 0

TSS
CBOD
E-Coli
TRC
Overall
About
Metrics and Dashboards

PM Compliance

Select Fiscal Year
2019

Select Site ID
- BT
- CT
- FT
- GT
- JT
- LT
- MT

Select Month
- Jan
- Feb
- Mar
- Apr
- May
- Jun
- Jul
- Aug
- Sep
- Oct
- Nov
- Dec

Status YTD- All Plants
- Compliant
- Non-Compliant

Status YTD - All Plants

Status WO Count
Non-Compliant: 599
Compliant: 1248

YTD % Compliance: 78%

Status By SiteID - YTD
JT

Status By SiteID - YTD
- Compliant
- Non-Compliant

Status by SiteID By Month
JULY

Status by SiteID By Month
- Compliant
- Non-Compliant

Status By SystemID - YTD
JT

SystemID
- UTL
- SUP
- SOL
- SEC
- PRI
- PRP
- INF
- FAC
- EFF
- DIS

WO Count
0 10 20 30 40 50 60 70 80 90 100

Details
Metrics and Dashboards

Reactive Work

Select Fiscal Year
2019

Status - YTD

<table>
<thead>
<tr>
<th>Status</th>
<th>Labor Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSIGNED</td>
<td>32207.29</td>
</tr>
<tr>
<td>REACTIVE</td>
<td>790.7</td>
</tr>
</tbody>
</table>

Status - By SiteID

<table>
<thead>
<tr>
<th>Status</th>
<th>Labor Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASSIGNED</td>
<td>2478.02</td>
</tr>
<tr>
<td>REACTIVE</td>
<td>250.8</td>
</tr>
</tbody>
</table>

Status - By SystemID

Reactive Hours By WO Type

Assigned Hours By WO Type
MSD Engagement

• MSD realizes that change management is the hardest part of building a sustainable AM program

• The organization uses facility message boards to keep AM front and center to staff across the organization

• And, MSD meets on a regular basis to share the success stories of their program development
MSD Engagement
MSD Engagement
MSD Engagement
Lessons Learned

✓ **People are the key to success.**
✓ AM is a program and not a project.
✓ There will be challenges along the way and the pace may not always be what you imagined.
✓ Change is hard, but if you engage your staff, you will achieve buy in and results.
Thank You Questions?

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it’s about connecting