

Using An Environmental Management System to Optimize Performance And Achieve Sustainability

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Twin Challenges Facing Wastewater Utilities

- Main Purpose – Provide clean, safe water
- But must also do so at minimum cost to rate payers

Thus, utilities must always strike the proper balance between optimizing performance and minimizing cost.



Increasing Challenges for Utilities

- Environmental
 - Increasing population + finite resources ➡ increasing environmental pressures (“shrinking planet effect”)
 - Increasing environmental pressures ➡ more stringent environmental regulations
- Economic
 - Aging infrastructure + increased economic pressures ➡ larger gap between needs & resources
- Demographic
 - Aging workforce ➡ potential loss of institutional knowledge



Thus, Utility Managers must:

- Improve environmental performance
- Replace aging capital
- Arrange for succession planning
- Without raising rates!



Solution → Increased Efficiency

- The utility manager must accomplish “more” with “less”
- The public utility must adopt the private sector focus on efficiency and optimization and harness it to the public good



Environmental Management Systems

- Help an organization identify its environmental performance goals
- Harness and direct the organization's collective wherewithal toward meeting performance goals
- Establish permanent, sustained drive toward continual improvement



Camden County Municipal Utilities Authority (CCMUA)

- Services 500,000 customers in Southern New Jersey
- Design Flow: 80 MGD
- Average Flow: 58 MGD
- Secondary, pure oxygen activated sludge treatment
- Discharges to Delaware River



Goals

CCMUA has three fundamental goals that are critical to its success:

- Optimization of Water Quality Performance
- Optimization of Air Quality Performance
- Cost Minimization



Initial Conditions

- CCMUA obliged to raise rates by 22½%, from \$275 per household to \$337
- Numerous odor complaints from neighboring residents
- Plant struggling to meet state discharge limits, despite receiving only 70% of rated capacity



Implementation of EMS

Identification of Core Corporate Objectives

- Optimization of Water Quality Performance
- Optimization of Odor Control Performance
- Cost Minimization

**Identification of Core Goals assures
sufficient allocation of necessary resources**



Gap Analysis

- Identify each critical process and...
- Identify the gaps between current performance levels and desired levels



Team Chartering & Awareness Training

- EMS Team composed of top management, ensuring corporate buy-in at highest levels of organization
- High level EMS champion an absolute necessity
- Core Corporate Goals Communicated from top management down to line workers
- Specific technical experience communicated from line workers back up to top management to ensure capture of all potential improvement opportunities



EMS Implementation

- Environmental Policy distributed to all employees
- Regular meetings of implementation team
 - Identify potential cost savings and renew enhancement opportunities
 - Identify ways to improve water quality and odor control performance
- Performance targets clearly articulated to all levels of staff
- Operational problems to be reported immediately to top management



Water Quality → Seek “Supercompliance”

- Decided that merely meeting permit was unacceptable; effluent quality should be optimized
- Required that all systems must be maintained and available for service
- Installed new sludge thickening and dewatering facilities to improve plant’s sludge removal capability
- Plant bypasses no longer permitted without express NJDEP approval



Air Quality → Change Institutional Culture

- Closed odorous sludge composting facilities
- Odor inventory by independent consultant
- Installed new odor control systems at plant headworks
- Imposed zero tolerance policy with respect to odors from carelessness (doors left open; odor systems left off, etc)
- Numerous outreach attempts to neighboring community to improve relationship



Environmental Management Systems – Environmental Benefits

- Effluent Quality Improved by 40-50%
 - 22ppm TSS in 1999 to 8ppm in 2008
 - 25ppm BOD in 1999 to 5ppm in 2008
- Sludge Removed Improved by 45%
 - 11,000 dry tons removed in 1999 to 16,000 dry tons in 2008
- Odor Violations down from 16 in 1997/98 to 4 from April 1998 to December 2008



Cost Impacts of Environmental Improvement

- Did improved environmental performance result in cost increases or rate increases?

NO!

- EMS team managers were directed not to choose between performance improvements and cost savings, but rather to look for initiatives that would both improve performance and reduce costs



Environmental Management Systems - Economic Benefits

- Reduced O&M Costs by 25% within three years
- Annual Savings of \$5,000,000 per year
- \$50,000,000 saved since 1999
- No rate increases since 1996, with three rate cuts

Achieving efficiencies in operations resulted in improved environmental performance and cost savings.



Environmental Management Systems – Other Benefits

- Reduced Risk of:
 - Adverse impact to environment and public health
 - Fines from regulatory agencies
 - Public complaints or lawsuits
- Improved relations with Regulatory Agencies & Neighbors
- Creation of Positive Environmental Culture
- Capture of Institutional Knowledge



Sustaining Infrastructure, Environment and Rates

- CCMUA will have replaced and upgraded the five major process units at the treatment plant by 2010
- Replacing under performing process units results in improved operational performance and reduced O & M costs
- Rate increase avoided by
 - Choosing projects for which operating cost savings exceed marginal debt service
 - Benefitting from lower cost state revolving funds which significantly reduce debt service requirements



Asset Management – A Key to Success

- Effective asset management was the single biggest factor in achieving both improvement in environmental performance and cost reductions
- Specifically, identifying and replacing underperforming process units:
 - Always improved environmental performance
 - Nearly always resulted in operation cost savings that equaled or exceeded debt service costs



Public & Private Sectors...

Really Not So Different

Private Utility

Maximize Profit

Optimize Product Quality

Serve Customers

Outside Competition

Public Utility

Minimize Cost

Optimize Environmental
Performance

Serve Ratepayers, and
Environment

Privatization or replacement

**Key: Adopt private sector efficiency and direct
to public good**



Benefits of EMS

- EMS provided the structural framework:
 - To harness the company's internal capabilities
 - Organize it, and
 - Then direct it in an unified manner to address the organization's top priority objectives
- EMS ensures that:
 - Top goals are continually given top priority, at all levels of the operation, top to bottom
 - Ideas are followed up on, until they are implemented
 - Organization strives for continual improvement in targeted areas



EMS Benefits Available to All

- EMS resulted in improved efficiency which led to both improvement in environmental performance and significant cost savings as well
- CCMUA achieved significant improvements through EMS even though:
 - It was an average, borderline compliant, utility prior to EMS
 - Camden City is the poorest city in the nation



Conclusion

- Increasing environmental and economic pressures require utilities to optimize efficiency to benefit ratepayers and the environment
- Environmental Management Systems are a very effective tool to help utilities optimize performance, strive for continual improvement and achieve long term sustainability



Conclusion (cont)

- Hundreds of utilities across the US are already benefiting from EMS
- If you're interested, go to www.peercenter.net for access to EMS resources



Thanks for Listening!

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